APR – 1 1950
VOL. 172, NO. 3

AMERICAN

MARCH, 1950

Gas Journal

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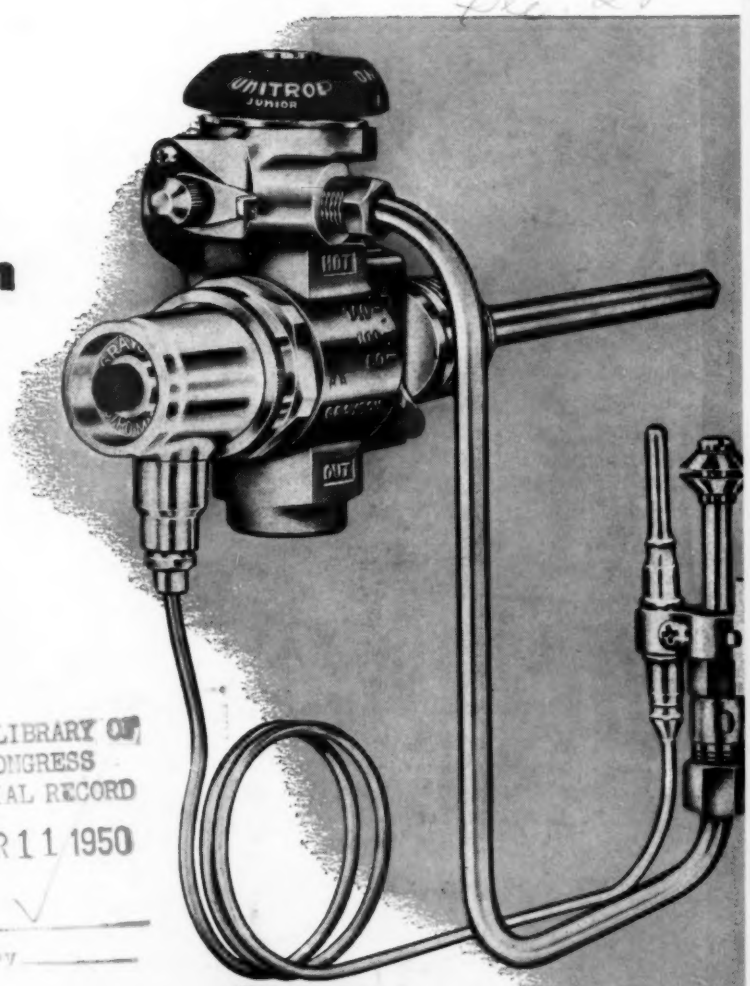
New

Robertshaw · Grayson

Unitrol Junior



Now, an Electro-Magnetic Automatic Pilot of the highest quality has been added to the reliable Grayson Standard WCT to provide the new Unitrol Junior. Outstanding field performance of Grayson's Standard WCT for the past 20 years has gained universal acceptance for Robertshaw-Grayson in the Plumbing and Public Utilities Industry. Now, the new Unitrol Junior leads the field in advanced performance. To insure perfect performance and complete customer satisfaction recommend the new Unitrol Junior.

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Robertshaw Fulton

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at ½-in. pressure absorption of 0.60 sp. gr. gas

BETTER MATERIALS . . .

notably a pressure cast aluminum alloy cover with *steel spud inserts* that give the needed thread strength without excess weight

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IMPROVED PERFORMANCE!

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Write for Bulletin No. 1100

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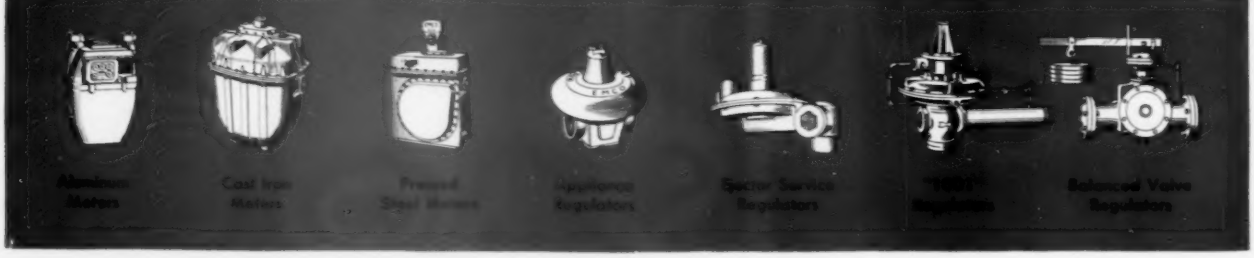

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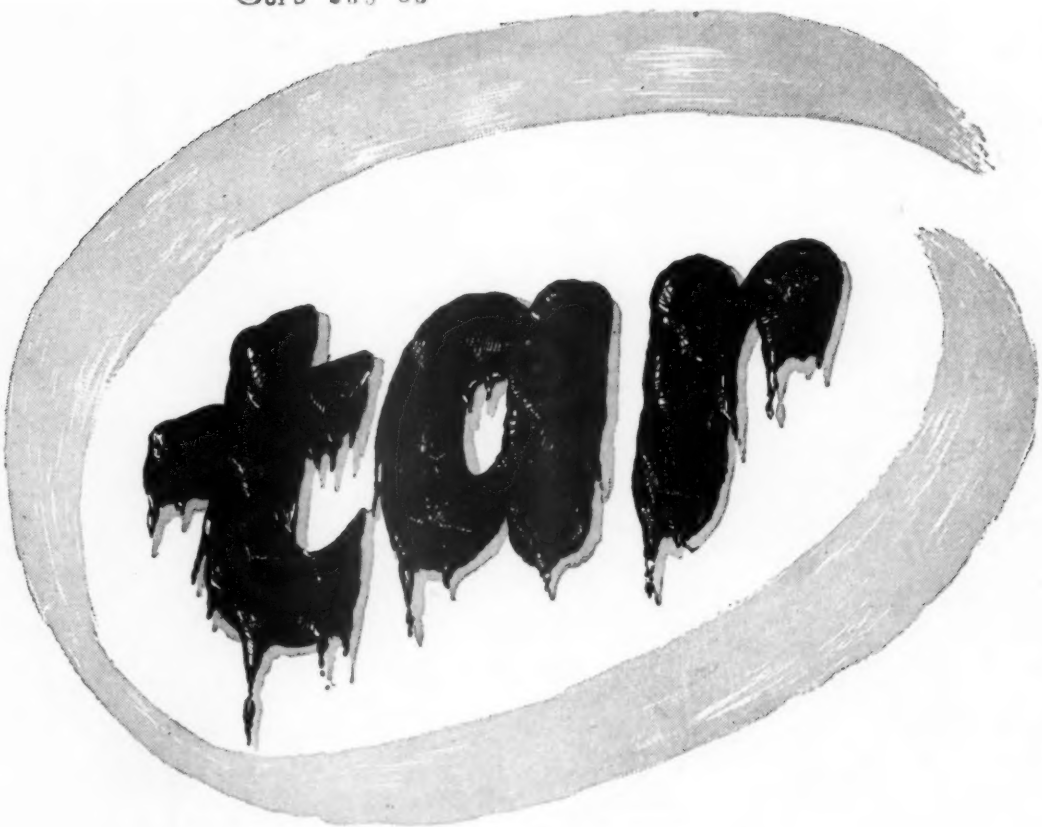

When you find it necessary to add a Tar Separator to your Gas Plant, more than ever will you value Semet-Solvay's span of experience in this field.

One consideration regarding this equipment lies in the need to avoid legal tangles due to contaminating effluent in streams. Local, state and federal regulations overlap and have become increasingly stringent. Perhaps your plant's production facilities have been increased without an equal increase of separation capacity or perhaps you are planning a new installation.

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ALLIED CHEMICAL & DYE CORPORATION

AMERICAN GAS JOURNAL, March, 1950. Vol. 172, No. 3. Published monthly by American Gas Journal, at 73 Main Street, Brattleboro, Vt. Executive and Editorial offices at 205 East 42nd Street, New York 17, N. Y. Entered as second class matter January 24, 1950, at the post office at Brattleboro, Vermont, under the Act of March 3, 1879. Printed in U.S.A.

Without beam strength—or, for that matter—without all of the strength factors listed opposite—no pipe laid 100 years ago in *city streets* would be in service today. But, in spite of the evolution of traffic from horse-drawn vehicles to heavy trucks and buses—and today's vast complexity of subway and underground utility services—cast iron gas and water mains, laid over a century ago, are serving in the streets of more than 30 cities in the United States and Canada.

Such service records prove that cast iron pipe combines all the strength factors of long life with ample margins of safety. No pipe that is provably deficient in any of these strength factors should ever be laid in city streets. Cast Iron Pipe Research Association, Thos. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3.

CAST IRON PIPE

Strength factors of Long Life !

No pipe that is provably deficient in any of these strength factors should ever be laid in city streets

BEAM STRENGTH

When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

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The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

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The toughness of cast iron pipe which enables it to withstand impact and traffic shocks, as well as the hazards in handling, is demonstrated by the Impact Test. While under hydrostatic pressure and the heavy blows from a 50 pound hammer, standard 6-inch cast iron pipe does not crack until the hammer is dropped 6 times *on the same spot* from progressively increased heights of 6 inches.

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In full length bursting tests standard 6-inch cast iron pipe withstands more than 2500 lbs. per square inch internal hydrostatic pressure, which proves ample ability to resist water-hammer or unusual working pressures.

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This is *not* a callback!

It's a happier day for dealers in your area (and a welcome relief for your own service crews) when new gas installations work to perfection, when callbacks are few and far between.

There are days and days like that in the life of the Bryant dealer. His customers, singing the praises of home heating and water heating equipment that never lets them down, have no cause to phone for servicemen.

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Yes, we're going to town with aggressive dealers, hoping to help them do better for themselves and a better job for you. May we tell you more about our plans? Just say the word.

Let the pup be furnace man ...and water boy, too!

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The most complete line of gas heating equipment in the nation

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The Separate Broiler **BERKSHIRE** the **MASTER BERKSHIRE** and the **BROCKTON**

The Extra Capacity **STRAND**

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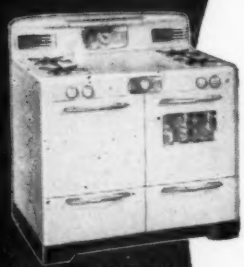

The Famous **MARLBORO** and the **MASTER MARLBORO**

The Beautiful **SHEFFIELD** and the **SHELBURNE**

Universal's

1950 Balanced Line of Gas Ranges

Offers a range

1. **To fit your kitchen**
2. **To fit your pocketbook**
3. **To fulfill your needs**
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THERE IS A MODEL 19 INCHES WIDE WITH A 16-INCH OVEN.
THERE ARE TWO MODELS 36 INCHES WIDE WITH A 16-INCH OVEN.
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Gas has got it and Universal proves it!

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The Kitchenette **GOTHAM**

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Here's Why Ashtabula Burns Gas, Rest of Area Doesn't
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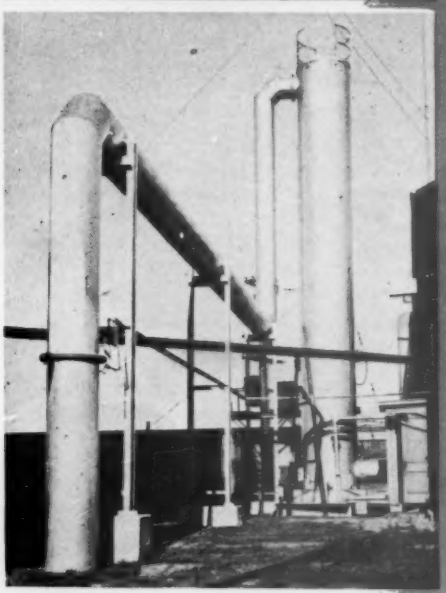

These pictures show why 13,000 consumers of the Lake Shore Gas Company in Ashtabula, Ohio, were able to continue using "coke oven" gas during a recent emergency period of several weeks.

Reforming equipment manufactured by The Gas Machinery Company had been installed in anticipation of the town's growth, to take care of peak demands and short-time emergencies. *This emergency* grew into weeks, yet service continued throughout the entire period.

In the installation pictured, LP vapors were reformed in a blue gas generator, cooled in a spray scrubber, and enriched to the standard heating value of the coke oven gas normally distributed.

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AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 172 MARCH 1950 NUMBER 3

This month...

Our Belmont, Mass., subscriber informs us that his copy of the February issue of AMERICAN GAS JOURNAL was delivered on Saturday, February 25. The issue was mailed February 15 from Brattleboro, Vermont, a good 90 miles away. That has the United States Mails moving at the staggering speed of nine miles a day. By mid April, at that rate our Pacific Coast readers should receive our last years Christmas greetings. If your copy of the JOURNAL doesn't reach you by the 20th of the month, please let us know. We are in a mood to raise unshirted hell about this mailing service.

It may be that the "Natural Gas Knocks at Southeastern Doors" story (page 10) will bring in a demand for reprints the way its companion piece, "Natural Gas in New Pastures," did in November. If the demand is sufficient to justify it we will have reprints made; but make your request early. Last time they came trailing in three months after the story had appeared.

Speaking of survey stories: We are in the midst of one on the Pacific Northwest and the possibilities of Alberta natural gas coming into that area within the next two years. There are more politics in the Canadian gas deal than there were in Kansas City when Boss Prendergast worked for Harry Truman, or vice versa. We hope the April issue will clarify the picture a little on both sides of the border.

A courtly note just received from a gentleman in New England enclosed a clipping from a plumbing journal dated 1932, extolling the content of the American Gas Handbook for that year. He has decided after mature deliberation that he would like to see a copy. We are asking him to consider the 1949 edition, as a more current substitute.

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Elliott Taylor · Editor

Howard F. Weeks · Associate Editor

Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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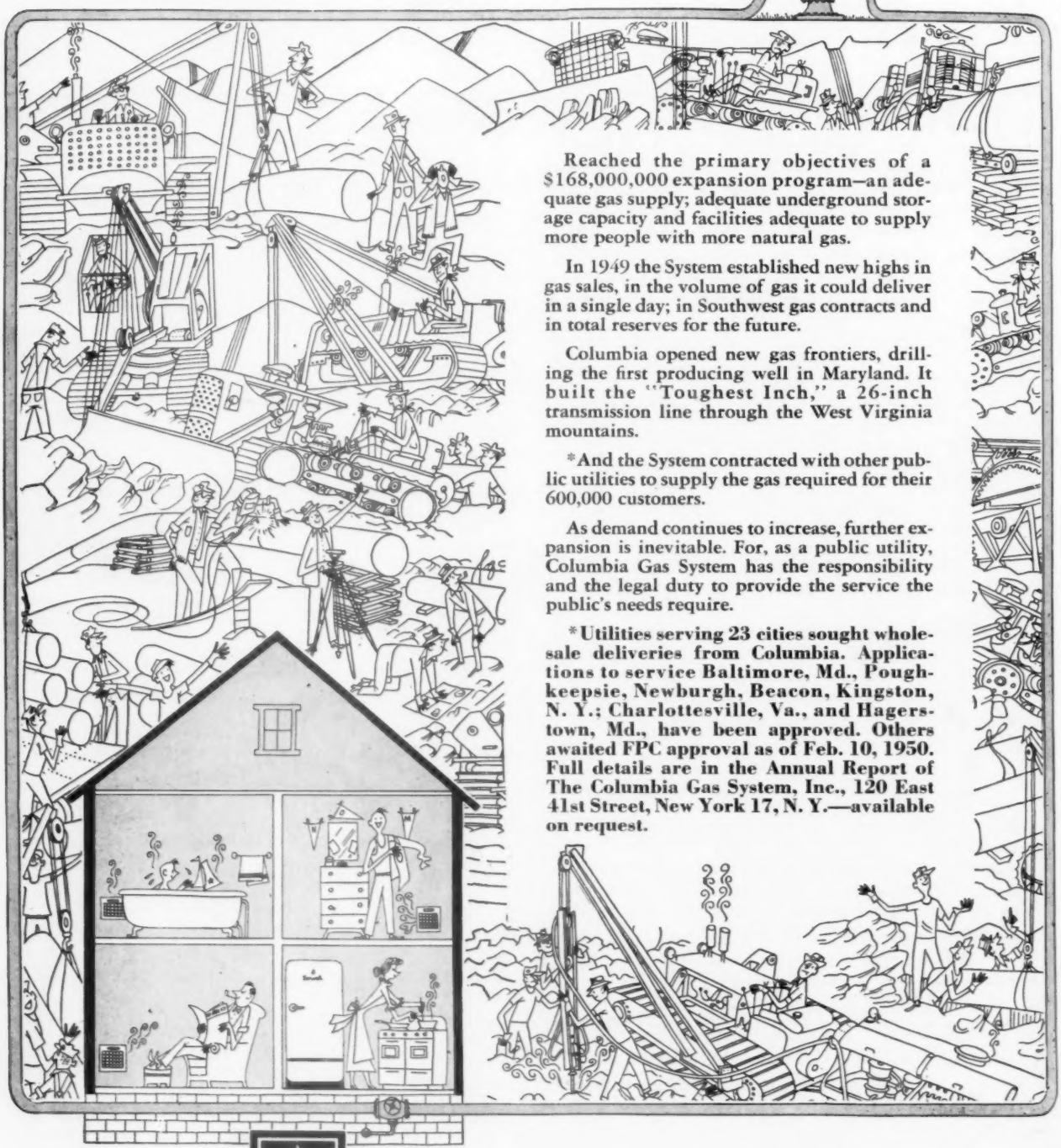
More Homes Can Be Served With*
NATURAL GAS in 1950 . . . Because

The Columbia Gas System in 1949 . . .



Reached the primary objectives of a $168,000,000 expansion program—an adequate gas supply; adequate underground storage capacity and facilities adequate to supply more people with more natural gas.

In 1949 the System established new highs in gas sales, in the volume of gas it could deliver in a single day; in Southwest gas contracts and in total reserves for the future.

Columbia opened new gas frontiers, drilling the first producing well in Maryland. It built the "Toughest Inch," a 26-inch transmission line through the West Virginia mountains.

*And the System contracted with other public utilities to supply the gas required for their 600,000 customers.

As demand continues to increase, further expansion is inevitable. For, as a public utility, Columbia Gas System has the responsibility and the legal duty to provide the service the public's needs require.

***Utilities serving 23 cities sought wholesale deliveries from Columbia. Applications to service Baltimore, Md., Poughkeepsie, Newburgh, Beacon, Kingston, N. Y.; Charlottesville, Va., and Hagerstown, Md., have been approved. Others awaited FPC approval as of Feb. 10, 1950. Full details are in the Annual Report of The Columbia Gas System, Inc., 120 East 41st Street, New York 17, N. Y.—available on request.**

COLUMBIA GAS SYSTEM

The Columbia Gas System

Editorial:

A Demand Charge for Heating

FROM where we sit it looks as if new entrants into the house heating gas appliance field are lining up like homesteaders along the Cherokee strip waiting for natural gas to arrive in quantity along the entire Atlantic seaboard.

Unless all of the implications of this fact are recognized in advance, and provisions made to cope with them, gas house heating may well prove to be the number one problem of the industry, instead of the prime potential market that it is so often thought to be.

For many years the promotion of gas house heating required real salesmanship. Particularly in manufactured gas areas, where therm rates were necessarily high in comparison with other fuels, the convenience and cleanliness of gas heating were promoted as premium attributes that demanded, and had to command, a premium price. Householders who went to gas did it knowing that it would cost them more, and convinced that it was worth it.

Now in area after area where natural gas has been introduced that price differential has ceased to exist. Gas at eight cents per therm is equal to No. 2 oil at 11.2 cents per gallon, or to anthracite coal or coke at twenty dollars a ton. With a prevailing price of 6.5 cents a therm in many communities it is little wonder that coal and oil have ceased to exist in the minds of the house heating customers. It doesn't take salesmanship to promote gas heating under such conditions; the real problem is to avoid a runaway heating market, with the serious disruption of load balance that such a market inevitably brings about.

A high load factor is a desirable attribute of any utility operation, but it is literally a matter of life or death to the gas transportation systems. It is for that reason that in practically all new city gate rates, the price which distributing companies pay for natural gas is on a demand and commodity charge basis. The local utility pays a demand charge based on its maximum take for any specified period, plus the commodity charge in cents per thousand of gas purchased.

Here is a paradoxical situation as far as the local utilities and their expanding house heating load is concerned. Most domestic customers are on a block rate, which means that the more gas they consume, the cheaper it is billed to them in terms of therms or thousands of feet. During winter months, and on particularly cold days, gas consumption rises rapidly; the peak day goes up, the demand charge increases correspondingly, and there it remains until another peak day boosts it to a new high.

Many devices are used with varying degrees of effectiveness to offset the unbalanced load thus brought about. Gas storage, high Btu manufactured gas or LP-gas stand-by facilities are the most familiar.

But it cannot be lost sight of, that all of these schemes increase the cost of gas to the consumer, and to the extent that they do, it means that the house heating customer responsible for the peak load, is in a measure subsidized by those who use gas only for cooking, water heating and refrigeration.

It has been suggested that the remedy for the situation is a general increase in rates to again make gas a premium fuel in comparison with coal or oil.

In our opinion, a much more fundamental approach to the problem must be undertaken. And it will require the understanding and the cooperation of both the gas industry and the rate making bodies under whose jurisdiction they operate.

A basic philosophy in rate making, well stated recently by L. R. Lefferson of Ebasco Services, is that "rate structures should be such that a customer can ask for and be permitted to use any kind of standard service he wants, provided his operations do not interfere with good service to others and, provided further that he pays any extraordinary costs of supplying the service."

The crux of his statement as far as our discussion is concerned is that the customer must pay any *extraordinary* costs of supplying the service. Translated into terms of gas house heating, this type of load does produce extraordinary costs through higher demand charges, and a method should be found to assure that house heating customers will pay those costs to the extent that their type and quantity of load is responsible for them.

Basically, this requires some form of demand or "ready to serve" charge that can be equated to the connected load of heating equipment installed in any residence. The simplest and perhaps the most equitable way to arrive at this charge would be to base it on the AGA capacity ratings of the house heating equipment installed.

We are well aware that this proposal will not prove popular in all quarters. Where the practice has been to install oversized equipment for its quick recovery characteristics, it will mean more careful engineering of the proposed new installations. The answer to that is that *properly* sized and not *oversized* jobs are a responsibility of the heating contractor, or of the utility, whichever makes the recommendation to the home owner.

State commissions, with their demonstrated reluctance to admit demand charges to gas rates, will have to learn that the choice is between making residential heating pay its way, or permitting increasingly large quantities of gas to be dumped for inferior uses so that pipe lines may operate at an economical load factor.

If it be true that peak demands make for higher costs, then no one in fairness can quarrel with the simple, understandable premise that the service responsible for peak demands should pay those costs.

Elliott Taylor

NATURAL GAS KNOCKS at SOUTHEASTERN DOORS

By Howard F. Weeks

NATURAL GAS is soon to make further inroads into the south Atlantic states. Presently there is going on a struggle between several pipe line companies to deliver fuel to the markets of Virginia, the Carolinas, Georgia, and northern Florida.

The battle is real. Three pipe line companies are striving to serve the Virginia area, and, farther south, two of the oldest major suppliers are contending for the business centering in and around Georgia, South Carolina, and northern Florida.

Many factors enter into the economics of natural gas expansion in the south. This section of the country is not highly concentrated, as are the northern Atlantic and New England states. The south has smaller population centers, with fewer utility users. And yet there is a heavy grouping of large industrial consumers of fuel, the most important being textile, paper and cement.

This means "off-line" or "direct sales" by the pipe line companies, as well as "sales for resale" to the local gas company systems. Broadly speaking, natural gas will be available to the general public largely in areas where large industrial loads make the building of the pipe lines a sound economic venture.

In this connection the attitude of the Federal Power Commission toward expansion of industrial gas consumption will decide to what extent and where new domestic customers can expect natural gas service. The use of natural gas as boiler fuel in steam electric generating stations is another factor involved. In the past the FPC has not looked with favor on this type of consumption except as a load balancer for the pipe lines. Where this load balancing has been a factor in line operation, it has generally tended to result in lower domestic rates. Roanoke and Charlottesville, the only two new cities in Virginia that are already assured of natural gas through the granting of FPC certificates, have announced that substantial rate reductions will be made.

Regardless of which pipe line companies win the prized territories, the fact remains that the general public will benefit from the introduction of natural gas service. The status of the struggle between the companies will be discussed starting with Virginia and moving southward.

Commonwealth Natural Gas Corp. and Piedmont Natural Gas Corp. have submitted plans to FPC to serve various portions of the Virginia area. A third competitor for part of the same area is the Natural Gas Service Corp., which filed an application for this purpose with FPC on Jan. 6, 1950.

Commonwealth Natural

Commonwealth's proposal involves building a 200 mile line with an annual capacity of 14,500,000 M cu. ft. from a connection with Virginia Gas Transmission Corp. at the Bickers compressor station about 15 miles north of Charlottesville, Va. This is part of the new line of the Columbia Gas System which serves Washington, D. C.

According to the plan the new line of Commonwealth will serve Petersburg & Hopewell Gas Co.; Virginia Electric & Power Co. in Norfolk and Newport News; Portsmouth Gas Co.; Suffolk Gas Co.; and the city of Richmond (municipally operated.)

The natural gas requirements of this particular area have been estimated by the local operating utilities as follows:

City	1951	1954
	in Mcf	
Richmond	2,293,600	3,624,800
Petersburg	346,600	464,700
Suffolk	77,500	107,300
Portsmouth	662,900	1,076,100
Norfolk	1,621,200	2,651,800
Newport News	539,800	1,129,800
TOTAL	5,541,600	9,054,500

In addition to the above cities, Commonwealth has named one large in-

Natural gas lines crossing the Potomac. Courtesy The Columbia Gas System, Inc.

Representative of large Southern industry is this plant of Lone Star Cement Co. Illustration courtesy Southern Natural Gas Co.

dustrial customer, the Solvay Process Division of Allied Chemical & Dye Corp., at Hopewell, Va. It estimates that this customer's usage will be 5,256,000 M cu. ft. a year, starting July 1, 1951. This amount of gas for direct sale would represent 44 per cent of the line's capacity in 1952, dropping to 37 per cent in 1954.

Piedmont Natural

Piedmont Natural Gas Corp. plans a line with an original capacity of 195,000 M cu. ft. daily, and an ultimate capacity of 365,000 M cu. ft. daily. The company first stated its purpose as far back as the middle of 1948. Several amendments were made in the original plan, and now the company has asked FPC approval of a new 1,305 mile pipe line from Texas to serve Virginia and the Carolinas. The line is expected to be completed in 1950 if the FPC grants approval before April 1.

It is in the Tidewater area of Virginia where Piedmont is in direct competition with Commonwealth. The following cities appear on the proposals of both: Newport News, Norfolk, Petersburg, Portsmouth, Suffolk and Richmond. In addition, Piedmont has specified Danville and Martinsville, Va.

In North Carolina Piedmont plans to serve the Duke Power Co. at Winston-Salem and Charlotte and four other communities. It also proposes to serve the Public Service Co. of North Carolina at Asheville, Durham, Raleigh, and three other communities; the Carolina Central Gas Co. at Hendersonville; the Piedmont Gas Co. at Hickory; and the North Carolina Gas Corp. at Lexington, Reidsville, and Thomasville.

In South Carolina Piedmont wants to serve the Duke Power Co. at Spartanburg, Greenville and Chester; the Anderson Gas & Utilities Co. at Anderson; the South Carolina Gas Co. at Gaffney; the Commissioner of Public Works at Greenwood; and the Rock Hill Gas Co. at Rock Hill.

Piedmont has disclosed that if its application is successful, it will purchase for five million dollars the ten gas properties of Duke Power Co. in the Carolinas. The plants serving these localities have 29,925 meters, and reported sales of 2,040,900 M cu. ft. of manufactured or butane gas in 1948. This purchase agreement, which has a deadline of Nov. 1, 1950, would take Duke Power Co. out of the gas business.

Among other things, Piedmont proposes to supply natural gas for boiler fuel for three existing electric generating stations of Duke Power and two others now being built. As a result during the first year direct sales would amount to 75 per cent or 63,200,000 M cu. ft. of the contemplated 72,500,000 M cu. ft. total sales when and if the line goes in operation.

Piedmont has estimated its gas sales for the Virginia Tidewater area as follows:

Year	Sales for Resale	Direct Sales	Total Sales
		in M cu. ft.	
1951	6,200,000	6,100,000	12,300,000
1952	7,600,000	6,100,000	13,700,000
1953	9,000,000	6,000,000	15,100,000
1954	10,200,000	6,100,000	16,300,000
1955	11,500,000	6,100,000	17,600,000

Piedmont's estimate of gas sales for the "Piedmont Area" of the Carolinas is:

Year	Sales for Resale	Direct Sales	Total Sales
		in M cu. ft.	
1951	3,100,000	57,100,000	60,200,000
1952	4,800,000	60,500,000	65,300,000
1953	7,000,000	62,300,000	69,300,000
1954	8,700,000	62,300,000	71,000,000
1955	10,400,000	61,000,000	71,400,000

Natural Gas Service

The newest entrant in the Virginia squabble—Natural Gas Service Corp.—proposes to build a 92 mile line of 80,000 M cu. ft. daily deliverability to serve Richmond, Hopewell and Petersburg from a connection at Buckingham, Va., with the Texas-to-New York line of Transcontinental Gas Pipe Line Corp.

This company's estimate of the gas requirements of the cities it proposes to serve is:

Year	Richmond	Petersburg and Hopewell
	in M cu. ft.	
1951	2,604,311	10,295,969
1952	3,294,628	11,029,000
1953	3,758,613	11,570,496
1954	4,131,054	11,956,165

The company has not submitted engineering or construction contracts in its application to FPC

Roanoke

Roanoke, in the west-central part of Virginia, was assured of natural gas supply when on Feb. 10 FPC authorized Virginia Gas Transmission Corp. and Roanoke Pipe Line Co. to construct facilities to supply the Roanoke Gas Co.

Virginia Gas Transmission will construct a metering and regulating station at a point on its main line near Gala, Va., and Roanoke Pipe Line will build a 30 mile, eight inch line from that point to the gas company's existing distribution system.

The Roanoke Gas Co. has 16,400 customers, and for 1948 reported sales of 877,598 M cu. ft. of 525 Btu gas.

The company estimates a need for 637,000 M cu. ft. of natural gas in 1950, increasing to 1,192,000 M cu. ft. in 1953. It expects to reduce its rates immediately by $200,000 a year.

Charlottesville

Charlottesville, Va., is also assured natural gas in the near future. Late in January FPC approved the proposal of Virginia Gas Transmission to tie in to

(Continued on page 13)

Present and Predicted Market for Gas in South Atlantic States

Distributing Companies and Towns Served	Pipe Lines Proposing Service	Market as of 1948			Estimated Future Market	
		Number of Customers	Btu	Annual Sales Mcf	1000 Btu Natural Gas For Year	Annual Sales—Mcf
VIRGINIA						
Charlottesville City Gas Dept.	Va. Gas Tr.	5,050	525	200,000	1953	250,000
City of Danville Gas Dept.	Piedmont	6,150	515	242,500	1960	766,000
Petersburg & Hopewell Gas Co.	Com'wealth	5,800	510	270,000	1954	464,700
	Nat. G. Svce				1954	11,956,100
	Piedmont					N. A.
Portsmouth Gas Co.	Com'wealth	13,100	525	472,400	1954	1,076,100
	Piedmont					N. A.
Richmond Dept. of Utilities	Com'wealth	41,700	525	2,353,500	1954	3,624,800
	Nat. G. Svce				1954	4,131,000
	Piedmont					N. A.
Roanoke Gas Co.	Roanoke	16,400	525	877,600	1953	1,192,000
Southwest Va. Gas Co.—Martinsville	Piedmont	700	550	25,700	1960	202,000
Suffolk Gas Co.	Com'wealth	1,500	850	47,300	1954	107,300
	Piedmont					N. A.
Va. Elec. & Power Co.—Norfolk & Newport News	Com'wealth	57,600	530	2,831,700	1954	3,781,600
	Piedmont					N. A.
NORTH CAROLINA						
Carolina Central Gas Co.—Hendersonville	Piedmont	900	1300	29,600	1960	139,000
Duke Power Co.—Burlington	Piedmont	1,750	900	12,600	1960	339,000
Charlotte	Piedmont	8,250	540	90,000	1960	2,100,000
Greensboro	Piedmont	6,200	540	335,000	1960	1,523,000
High Point	Piedmont	2,100	900	136,000	1960	910,000
Salisbury	Piedmont	1,700	900	85,000	1960	542,000
Winston-Salem	Piedmont	4,660	540	301,300	1960	1,693,000
No. Carolina Gas Corp.—						
Lexington	Piedmont	750	620	31,300	1960	205,000
Reidsville	Piedmont	1,000	640	50,000	1960	416,000
Thomasville	Piedmont	230	2526	11,400	1960	182,000
Piedmont Gas Co.—Hickory	Piedmont				1960	690,000
Public Service Co. of No. Carolina						
Asheville	Piedmont	4,000	540	192,700	1960	1,253,000
Concord	Piedmont	1,100	840	54,100	1960	849,000
Durham	Piedmont	4,400	540	300,000	1960	1,214,000
Gastonia	Piedmont	1,500	540	128,700	1960	532,000
Raleigh	Piedmont	4,700	540	285,500	1960	1,010,000
Statesville	Piedmont	1,200	840	49,700	1960	350,000
SOUTH CAROLINA						
Atlanta Gas Light Co.—Aiken	So. Natl.	500	540	37,000	1954	58,900
Anderson Gas & Utilities Co.	Piedmont	1,150	900		1960	539,000
Duke Power Co.—Chester	Piedmont	160	540	11,500	1960	163,000
Greenville	Piedmont	4,650	540	280,000	1960	1,649,000
Spartanburg	Piedmont	3,600	540	198,000	1960	840,000
Greenwood Municipal	Piedmont	600	740	23,400	1960	316,000
Rock Hill Gas Co.	Piedmont	800	640	31,400	1960	356,000
So. Carolina Gas Co.—Gaffney	Piedmont	920	1300	31,600	1960	181,000
So. Carolina Power Co.—Charleston	At. Gulf	11,000	550	646,300	5th year	14,292,400
5 additional communities now having no gas	At. Gulf				5th year	1,653,000
GEORGIA						
Albany Gas Works	At. Gulf	3,450	525	191,000	5th year	964,100
Atlanta Gas Light Co.						
Augusta	So. Natl.	9,000	538	737,000	1954	2,568,500
Brunswick	At. Gulf	1,800	534	120,000	5th year	536,100
Valdosta	At. Gulf	1,800	851	84,000	5th year	538,200
Waycross	At. Gulf	2,000	530	140,000	5th year	420,000
LaGrange Gas Dept.	So. Natl.	915	800	38,800	1954	261,300
Savannah Gas Co.	At. Gulf	17,000	500	989,000	5th year	6,815,200
24 additional communities now having no gas	At. Gulf				5th year	3,906,900
2 additional communities now having no gas	So. Natl.				1954	83,600
FLORIDA						
Jacksonville	At. Gulf	19,300	516	1,061,000	5th year	3,505,500
Tallahassee (Municipal plant)	At. Gulf	1,200	535	43,800	5th year	512,500
9 additional communities now having no gas	At. Gulf				5th year	1,535,600
ALABAMA						
Ozark Municipal Gas Plant	At. Gulf	250	550	7,000	5th year	67,700
Troy, City of, Gas Dept.	At. Gulf	800	530	30,000	5th year	175,600
6 additional communities now having no gas	At. Gulf				5th year	1,155,900
15 additional communities now having no gas	So. Natl.				1954	427,000

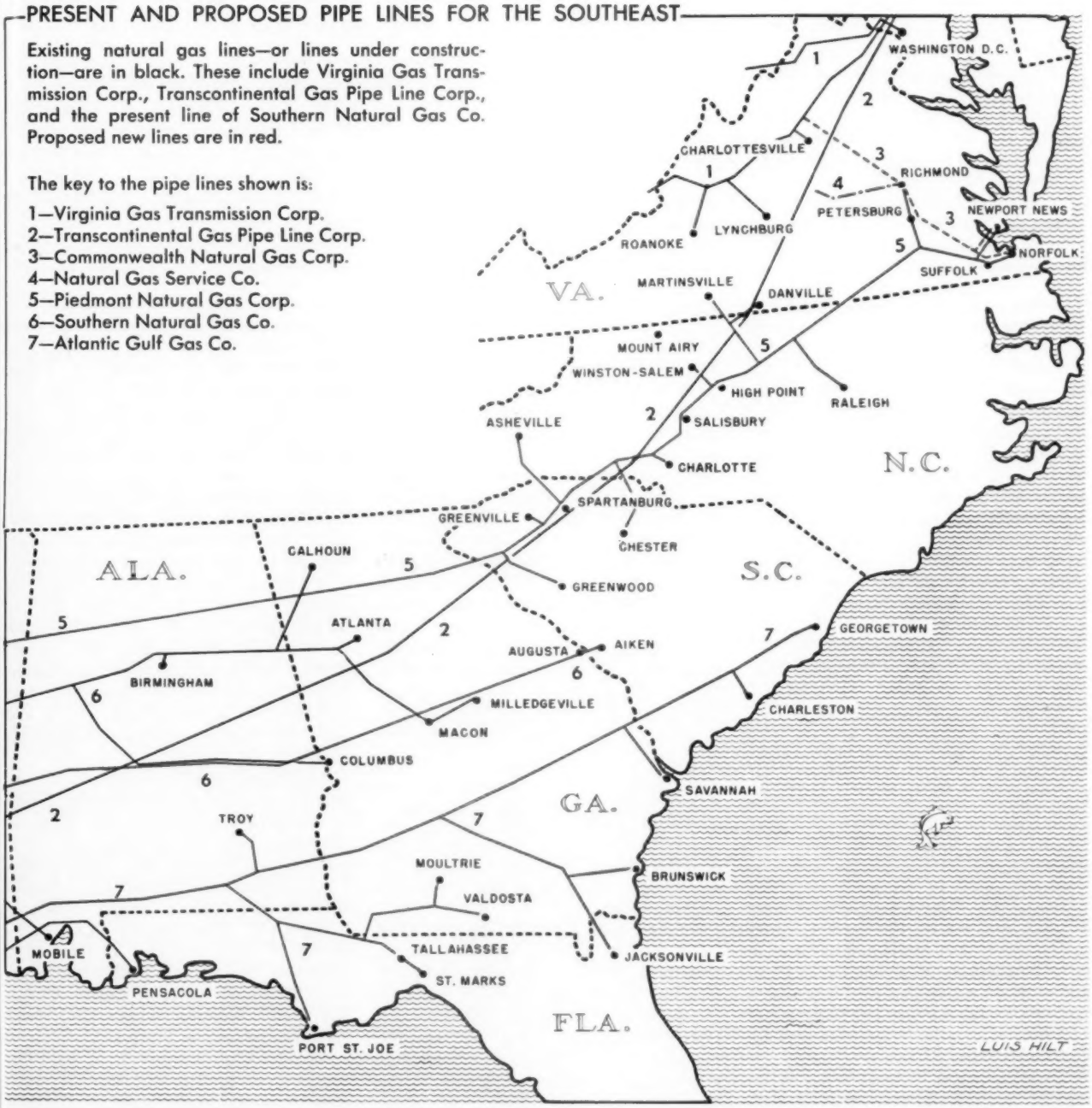
N. A.: Figures not available

PRESENT AND PROPOSED PIPE LINES FOR THE SOUTHEAST

Existing natural gas lines—or lines under construction—are in black. These include Virginia Gas Transmission Corp., Transcontinental Gas Pipe Line Corp., and the present line of Southern Natural Gas Co. Proposed new lines are in red.

The key to the pipe lines shown is:

1—Virginia Gas Transmission Corp.
2—Transcontinental Gas Pipe Line Corp.
3—Commonwealth Natural Gas Corp.
4—Natural Gas Service Co.
5—Piedmont Natural Gas Corp.
6—Southern Natural Gas Co.
7—Atlantic Gulf Gas Co.



(Continued from page 11)

its line the city of Charlottesville, which has a municipally operated gas system. The city will build about 14 miles of six inch pipe line to a metering and regulating station near Doylesville, Va.

There are 5000 customers, and sales of 198,433 M cu. ft. of 525 Btu gas were reported for 1948. With natural gas, the city estimates its annual demands at 129,800 M cu. ft. in 1950 to 250,000 M cu. ft. in 1953. The city expects to reduce rates by 30 per cent.

Southern Natural

The situation in the deep South is equally competitive with that farther north. Two pipe line companies want to advance toward the Atlantic seaboard, and the first applications filed by each sought to serve substantially the same areas.

These companies—Southern Natural Gas Co. and Atlantic Gulf Gas Co.—are reaching for the rich industrial markets in Georgia, South Carolina, and Florida.

Southern Natural's existing lines now serve parts of Alabama and Georgia. It delivers natural gas to the Atlanta Gas Light Co., and to 22 of the communities that the utility company serves. A total of 145,000 customers is involved. It also supplies the Gas Light Co. of Columbus, Ga., which has about 15,000 customers in Columbus and Fort Benning. It serves Alabama Gas Corp., with 97,000 customers.

Southern Natural in its original application filed with FPC in April 1947 asked for a certificate to extend service from its existing lines to Tallahassee and Jacksonville, Fla.; to Georgetown, Columbia and Savannah, Ga., and to Charleston, S. C.

The line proposed was to take off from the existing 24 inch line that carries gas from the Gwinville, Ala., field to the area in west central Georgia, notably Atlanta, Macon, and way points already being served by the company.

FLASH

AT PRESS TIME—The Carolina Natural Gas Corp. has just filed an application with FPC to serve a number of communities in North and South Carolina. It proposes to construct a main line and lateral connections—a total of 372 miles—with Transcontinental. Capacity will be 140,000 M cu. ft. daily.

Communities to be served in the Carolinas are the same as named by Piedmont in its application. (See table on page 12.)

GAS SALES IN SOUTH ATLANTIC STATES—1948

	Manufactured Gas	*Natural Gas*	*Town LP-Gas*
	in M cu. ft.		
Virginia	*7,212,000*	*3,656,000*	*229,000*
North Carolina	*2,913,000*	*none*	*844,000*
South Carolina	*2,087,000*	*none*	*245,000*
Georgia	*1,879,000*	*45,754,000*	*276,000*
Florida	*6,846,000*	*8,788,000*	*218,000*
Alabama	*7,722,000*	*59,305,000*	*29,000*

The line and its branches as then contemplated would have carried natural gas to communities along the Atlantic seaboard from Georgetown, S. C., on the north, to Jacksonville, Fla., on the south. Still another branch was planned to Tallahassee in the gulf coast area.

In all, a total of 29 communities was to be served within five years of the completion of the line. Many of them were small, and the total population of all new areas was estimated at slightly more than 800,000. At the time the application was made, Southern Natural envisioned a system capacity of 540 M cu. ft. of natural gas a day. Of this, it was thought that approximately half would be required for the new communities and industries to be served.

At the company's own request FPC action on the application was deferred and no hearings have been held to date.

However, in December 1949 Southern Natural filed a new application with FPC for permission to build an entirely new line with a daily sales capacity of 129,000 M cu. ft. from Gwinville field to Augusta, Ga., and Aiken, S. C. This area represents only a small portion of the total territory that the first line contemplated was to have reached. It is planned largely to add new industrial load to the Southern system through serving the large paper and textile manufacturing concerns located in central Georgia.

While Southern Natural is not pressing for hearings on its original application to serve the coastal areas and the new communities first requested, this does not mean necessarily that it is abandoning the possibility of future service to the larger area or that it will yield the territory without a struggle.

About 20 municipalities are served by Southern Natural—sales to them being estimated at 1,897,200 M cu. ft. in 1950—increasing to 2,620,100 M cu. ft. in 1954.

The company makes direct sales to 35 customers. In 1950 it is estimated that these sales will amount to 28,702,700 M cu. ft. and will increase to 30,592,700 M cu. ft. in 1954.

In regard to the new line, Southern Natural estimated that in 1954 sales for resale would amount to 3,399,360 M cu. ft. a year. Of this, 2,568,500 M cu. ft. will be used in serving the Atlanta Gas Light Co. at Augusta, Ga., and 58,890 M cu. ft. for the same company at Aiken, S. C. There are 9000 customers in Augusta, and production of 737,244 M cu. ft. of 538 Btu water gas was reported for 1948. Aiken, with 500 customers, is served with butane air, production of 37,371 M cu. ft. being given for 1948.

The balance of the gas for resale would be used in 17 smaller communities in Georgia and Alabama, none of which at present has utility gas service.

New direct sales by Southern Natural made upon completion of the proposed pipe line have been estimated at 47,333,055 M cu. ft. to a total of 31 customers. However, of this amount, only 1,461,400 M cu. ft. will be on a firm load basis.

Atlantic Gulf

Atlantic Gulf is a newly formed subsidiary of United Gas Corp., which has headquarters in Shreveport, La., and is one of the oldest pipe line companies in the country.

Atlantic Gulf Gas Co. was formed to build a pipe line from south-eastern Louisiana to the Atlantic seaboard, passing through the southern parts of the states of Mississippi, Alabama and Georgia, and also extending into the northern part of Florida on both gulf coast and Atlantic seaboard sides of the state. The proposed line is to terminate at Georgetown, S. C., about 60 miles north of Charleston.

The original Atlantic Gulf application was filed with FPC in April 1947. In an amended application filed early in 1949, and on which hearings were held from August to December, the company stated its desire to construct 1731 miles of line, with a capacity of 384,251 M cu. ft. of natural gas a day. The purpose is to serve at least 54 communities in Alabama, Florida, Georgia and South Carolina. The estimated population of the service area was 761,000 as of 1948. The total present customers of utilities serving the area are 57,800 residential and 3900 commercial users. Sales of manufactured gas or butane air through town gas systems total 3,360,200 M cu. ft. a year. Since the company expects to distribute during its first year of operation 76,987,000 M cu. ft., it is obvious that sales to industrial users, including steam electric generating stations, will constitute the bulk of the line's operation, and is the basis on which its construction is to be justified.

As a matter of fact, a listing of the industrial concerns with factories or plants in this area reads like a blue book of American business. Included are Container Corp. of America, US Gypsum Co., International Paper Co., Union Bag & Paper Co., Lehigh Portland Cement Co., American Can Co., B. F. Goodrich Co., Hercules Powder Co., Goodyear Rubber Co., Republic Steel Co., Shawmut Mills, Celanese Corp., Pepperell Manufacturing Co., and Champion Paper & Fibre Co.

Atlantic Gulf estimated, in its FPC appearance, that if natural gas were made available in the territory it would like to serve, the number of customers would run somewhere between 85,000 and 100,000, or about double the present figure. To serve the 54 communities it plans to, Atlantic Gulf contem-

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PREDICTED LOAD—"SALES FOR RESALE" AND "DIRECT SALES"

Supplier	*Gas for Resale by Utilities*	*Direct Sales*
	in M cu. ft.	
Commonwealth Natural, *1954*	*9,054,000*	*5,256,000*
Piedmont Natural, *1955*	*21,900,000*	*67,100,000*
Virginia Gas Transmission		
Roanoke, *1953*	*1,192,000*	
Charlottesville, *1953*	*250,000*	
Atlantic Gulf, 5th Year	*36,078,800*	*52,246,000*
Southern Natural, *1954*	*111,261,900*	*77,925,700*

Natural Gas Odorizing A Fundamental For Systems Planning to Convert

By Marshall Hyde

THE term odorization is usually taken to mean the addition of odoriferous materials to fuel gases for the purpose of making those gases readily detectible through the sense of smell.

The need for odorization of manufactured gases, of the type commonly distributed, has never been seriously considered by the industry. It may be noted in passing, however, that odorization might be profitably employed in this field for reason of the additional safety factor that would attend its use.

The need for odorization of LPg-air mixtures is gaining in recognition. Operators are becoming increasingly aware of the fact that the odorant added to LPg by the refiners, while adequate for liquid gas storage and bottled distribution, disappears quickly in the presence of oxygen in distribution systems.

The need for odorization of natural gas is generally recognized, with a few notable exceptions, and is carried out by the natural gas distributing companies or by the transmission companies supplying them. Some regulatory bodies have prescribed the odorization of natural gas but only one has defined a rule for measuring the degree of odorization. Another has directed the minimum quantity of odorant to be added.

Thousands of materials are known that might be used to odorize gas but the fundamental requirements for a compound in this service remove all but a comparative few from practical consideration. A gas odorant must impart a disagreeable odor to the gas, it must be soluble in gas in sufficient quantities, it must be effectively destroyed by combustion, and it must be commercially available at a reasonable price. In addition, a good material should have an odor character suggestive of "gas" and a high degree of stability in the presence of oxidizing agents.

The first successful gas odorant introduced over 20 years was low in concentration by present standards. It did not present a serious handling problem for installations of reasonable size, and it could be held in solution in natural gas at most of the line pressures and temperatures then encountered. It also favored "gas" in odor characteristics, and it was stable to oxidizing agents in marked degree.

Mr. Hyde is a graduate of University of Michigan in chemical engineering. He has been in the gas industry for 25 years, as operator and as sales representative.

At a later date the concentrated mercaptans were made commercially available for gas odorization. They gained rapid acceptance for their high odor value (some 18 to 20 times that of the dilute material) and for the purchase savings they represented. At the present, mercaptan base odorants are almost universally used, the principal area of exception being the West Coast where freight rates do not mitigate against the more dilute material.

The swing to mercaptan base odorants was accompanied by the loss of two important odorant qualities—those of gas-like odor and stability. Once a gas company's customers had been taught to associate the odor of mercaptans with escaping gas, the first factor lost some measure of its importance. And, in as much as distribution systems seldom exceeded 25 miles in length from the point of odorant introduction, the loss of stability was not generally noted or recognized as cause for concern.

The growth of distribution systems and the addition of stand-by facilities for peak loads brought this matter of stability loss to the attention of many operators. In some cases it was countered by a return to the more dilute and expensive but stable odorant, but in others it was accepted as a necessary shortcoming of mercaptans.

Mercaptans are changed by metallic oxides to the corresponding disulphides. As disulphides have a sweetish odor, an odor value about 1/10th that of mercaptans and a much higher boiling point, the result of their formation is an effective odor loss. This may be followed at some later time by an increase in odor level when the high boiling disulphides, having condensed out in the mains at the time of their formation, return to the vapor state under favorable pressure and temperature conditions.

In systems of limited length, odorization by mercaptans can be secured and maintained once all the active oxides in the mains have been reduced, and provided no oxygen bearing gases are introduced, even for brief periods, so as to revivify those oxides.

Improvements Made

Important advances have been made by odorant manufacturers in the improvement of mercaptan odorants. They have found that a true gas-like odor can be simulated by using a mixture of mercaptans blended together with small amounts of other odoriferous materials. They have also found that near-perfect stability can be had through the addition of small amounts of alkylated phenols to the mercaptan blends. With these accomplishments, the odorization industry has been able to serve the gas industry with highly concentrated products of gas-like odor and a degree of stability that will insure the odor level over hundreds of miles of transmission line and in the presence of large amounts of oxygen.

With the demands for concentration, gas-like odor, and stability successfully met, additional requirements are now being put forth by some gas companies. The new qualities most desired are those of low sulphur content and improved soil penetration.

Mercaptan-free odorants are now available but are gaining acceptance slowly. There seems to be no general

need for such a material and it represents a loss of the gas-like odor quality. Another new odorant is mercaptan-free, has a gas-like odor, and a total sulphur content of less than one per cent as compared with a 33 to 43 per cent sulphur content for the mercaptan blends. However, in economy of use, this odorant represents a 50 per cent increase in volume and cost over the mercaptan blends; factors that the prospective customer must balance with the advantages that such an odorant may appear to hold for him.

Soil Penetration

The matter of improved soil penetration presents a difficult problem. The demand for this quality arises from the fact that some companies, on changing from manufactured to natural gas distribution, experience an increase in the number of explosions on customers' premises and, in the anxiety that naturally accompanies such a situation, note on occasion the apparent low level of odor or lack of odor in the escaping gas.

It is possible that, in some instances, the company may gain the impression that the gas was odorless from the testimony given by the injured party and witnesses friendly to him. Assuming in a particular case that the best possible job of odorization was being done, this increased explosion rate may be in part attributed to the greatly increased use of gas that follows a conversion, the drying out of the system with consequent increased leakage, and the common practice of increasing distribution pressures for the sake of increased capacity. Deferred maintainance of underground piping in the face of war-time shortages may also be a factor.

One fact seldom recognized is that the odorous constituents of manufactured gases are filtered out by soils as readily as are the introduced odorants. The toxic effects of manufactured gases are sometimes effective in warning a customer of leakage.

All odorants, as well as the odorous constituents of manufactured gases, will come through soils if given sufficient time. However, the fact that odorants do filter out in soils cannot be denied, and if the penetration ability of odorants could be increased it would be an important forward step.

Some evidence indicates that materials of lighter molecular weight penetrate soils more readily. Other evidence seems to associate soil absorption with chemical activity. One approach to the problem lies in the supplemental addition of relatively light materials having low odor value and used in comparatively large quantities. If they were materials of some chemical activity, they might be even more effective. The goal would be to saturate the soil at the point of leakage in as expeditious a manner as possible.

Odorization is adopted, almost without exception, by companies upon changing from manufactured to natural gas distribution. It is advisable to begin odorization in a property concurrent with the introduction of natural gas for the reason that such a change is usually accompanied by the drying out of deposits in the mains. These solid materials adsorb the odorant and considerable time is sometimes required to "satisfy" them. This delays the establishment of a satisfactory odor level throughout the entire system. Fortunately, oil fogging and humidification shorten this period and the odorous residues present in the mains from the manufacturing process act as gas odorants during this transition period.

Two Methods

There are two fundamental methods of odorizing gas. One is through the evaporation of the odorant into a gas stream by-passed from the main flow. The other is through the direct addition of the odorant to the main gas flow. Either method may be manual or automatic in any desired degree. Where attendance is already available at the point of odorization, it may be used and the expense of automatic equipment kept at the minimum consistent with the available attendance.

Space does not permit the description and discussion of the multitude of variations of these two methods that are employed by the gas industry. The selection of an installation should be predicated on careful planning, with due regard for all of the factors involved. As the manufacturers of odorants have a wide knowledge of the devices and schemes in use for odorization and because they are vitally interested in insuring the successful use of their odorants, they are one good source of dependable advice on this matter.

With the evaporation method, careful account must be taken of the effect of temperature on the vapor pressure of the odorant and attention must be paid to the fact that a constant-boiling-point material is usually required if difficulties from the accumulation of heavy ends in the odorizer are to be minimized.

In using the direct addition method, there must be provision for positive protection against the possibility of accidental discharge of a large quantity of the odorant into the gas stream. Such an occurrence can be very damaging to public relations while causing an undue amount of service expense.

While gas odorants have reached a high state of perfection, the development of reliable physical and chemical methods of measuring odor level has made little progress. The gas industry needs a method, preferably a recording one, for determining odor level. Unfortunately, none of the methods based on sulphur determination can translate their readings into that somewhat intangible quality called odor level.

Copper oleate will react with some of the mercaptans. In application, filter papers impregnated with copper oleate are exposed to the gas stream and then to sunlight. If certain mercaptans were present in the gas, the papers will usually darken on exposure. So, if the papers darken, it may be assumed that mercaptans are present in the gas. However, if the papers do not darken, it cannot be assumed that mercaptans were not present. Efforts to make such a test of quantitative value have not met with success and, as the papers fade in file, it will be seen that the test is of very little permanent record value.

A promising contribution has been made by the development of a method of determining the mercaptan content of gases through the electronic colorimetric comparison of copper butyl phthalate solutions. The method does not lend itself to tests made outside a laboratory.

Room Tests

Some operators have tried room tests and have met with varying degrees of success. As required by one state commission, room tests do produce evidence of the presence or lack of odor in a system and some degree of comparison of the level of odor at various points in that system. Some companies have tried the taking of gas samples at various points and the bringing of these samples to a central location for room tests. The shortcomings of room tests lie in the difficulty of obtaining a uniform mixture of the gas sample and the room's atmosphere and the psychological and physiological factors present in the observers.

Pending the invention and standardization of a mechanical nose, there is presently only one reliable method of odor level control. It is based on the principle that *odorant is added to gas for the direct benefit of the customers of the company* and for the *indirect benefit of the gas company*. In the customers as a body we have what amounts to the standard nose for the locality served by any one gas company. This standard nose can be used in the control of odor level in the following manner.

The gas company should record all leaks reported by customers and plot

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Metallizing Method of Holder Protection Used at Long Beach, Calif.

By Arthur Rohman
Western Editor

A COMBINATION of salt and industrial atmospheres has made the protection of gas holder equipment a problem of particular concern for the Long Beach Municipal Gas Department.

The once blue and tange atmosphere over Long Beach, now a teeming and growing city of 285,000 people situated in the Los Angeles Harbor area, today combines the corrosiveness of brine with that of the acids, sulphurs, and fumes which are the result of the development of oil refineries and other industry both within and around the city.

Late in 1945 the Gas Department completed construction of four high pressure, horizontal gas holders designed to provide two million cu. ft. of gas daily as one means of meeting increased winter demands. Specifications called for the protection of the tanks by the following procedures.

The tanks were wire brushed to remove all loose scale, oil, and dirt, and then were given a coat of No. 84 zinc chromate primer topped by a coat of good quality aluminum paint.

In about 18 months the paint started to show signs of deterioration, such disintegration starting at the base of the coat and working outward. This condition indicated that the salt air, acids, and fumes were penetrating the aluminum paint and primer, and were reacting in a corrosive manner on the steel in the tank proper.

By early 1948 the tanks had a generally rusted appearance, and a large sign reading, "Gas Department—City of Long Beach" had become virtually obscured. While actual corrosive damage to the tank proper was slight, it became expedient to prevent further corrosion and to improve the appearance of the tanks to consider re-protection of the tanks.

After investigation it was decided that an experimental combination of metallizing and painting would be employed to determine the most effective methods of protecting and assuring the good appearance of the facilities for the longest period of time.

In order to provide a comparison of different methods and materials, each of the four tanks was given a different treatment. One tank was completely metallized. On the second tank only the upper half, including the girders, was metallized with the lower portions being painted. The third tank was painted with two coats of Rustite and two coats of fume proof Plastik paint. The fourth tank was protected with two coats of red lead and two coats of Plastik paint. This work was completed late in 1949, and a recent inspection showed no signs of rust or corrosion on any of the tanks.

At the top: The tank at left received two coats of red lead and two coats of Plastik fume proof paint. The second tank was painted with two coats of Rustite and two coats of Plastic. No. 3 tank was 50 per cent metallized, including the upper half and girders. No. 4 tank, at right, was all-metallized. Inspection revealed no corrosive damage to any of the tanks.

The author acknowledges assistance given him by E. S. Bryant, assistant superintendent, Municipal Gas Department, Long Beach, and Bertram Smith, Metallizing Engineering Co.

The total area protected was 90,406 square feet, being a total of the surface area of each of the four 34-foot diameter, 205-foot tanks plus stairway, platform, piping, rails, and miscellaneous appurtenances.

The contract price for the entire job was $35,598. Although this figure is hardly indicative of what costs might be to accomplish similar work on other utility systems, a breakdown of the cost is as follows:

Tank No. 1—Sandblasting, second sandblast, if required, and metallizing entire tank, $9,507.00.

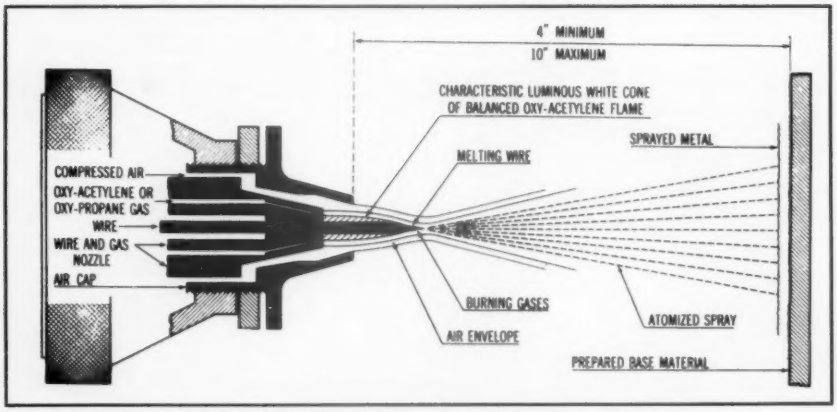
Tank No. 2—Sandblasting and metallizing upper half; sandblast and paint lower half, $8,798.00.

Tank No. 3—Sandblast and paint with two coats of Rustite and two coats of Plastik paint, $7,957.00.

Tank No. 4—Sandblast and paint with two coats of red lead and two coats of Plastik paint, $7,957.00.

Appurtenances: Protection as specified, $1,379.00.

Because of the wide use of paint for



Schematic drawing of the gun used for metallizing

gas holder protection, this article is confined to a description of the metallizing process as used by the Long Beach Municipal Gas Department.

The following tabulation shows materials and man hours used in sandblasting, painting and metallizing of the four high pressure gas holders.

Materials:

Red Lead	120 gallons
Rustite	125 gallons
L-317 (Grey)	160 gallons
L-318 (Grey)	150 gallons
Black	35 gallons
Zinc	11,644 lbs.
Acetylene	20,182 cu. ft.
Oxygen	37,060 cu. ft.
Sand	502 tons

Labor:

Painting	1,490 man hours
Metallizing	1,260 man hours
Sandblasting and pot-tending	2,440 man hours
Labor	1,600 man hours.

Records do not show the breakdown of labor and material for each tank. However, the approximate area of painting was 56,424 sq. ft. and the area metallized 35,022 sq. ft. Approximately 50 per cent more man hours and sand were required for sandblasting for metallizing as compared to sandblasting for painting.

The above tabulation includes labor involved in scaffolding, moving materials and general set-up. However, it does not show material involved to produce the necessary compressed air and does not indicate machinery depreciation, scaffolding rental, or miscellaneous supplies.

Prevailing wage scales were paid on the job. The wages paid to journeyman, journeyman brush painter, steel and bridge painter, sandblaster or spray painter, and sandblaster (pot tender) ranged from $2.00 to $2.375 per hour. A metal spray operator was paid $2.50 per hour, while a metal spray operator's helper received $1.75 per hour. All foremen were paid not less than $1.00 per day more than the journeyman rate for the craft involved. All other skilled classes were paid not less than $2.00 per hour. Standard wages were paid for air compressor operators, apprentices, laborers, and clean-up men.

Metallizing Process

Metallizing is a process that applies any metal in its pure state to any surface—either metallic or non-metallic. It has nothing in common with either welding, brazing, or plating. Characteristics of a metallized surface are:

The metal treated undergoes no change since no appreciable heat is transmitted during metallizing.

A metallized surface has a finely textured matte finish similar in appearance to No. 0 emery cloth.

No drying or setting period is necessary.

The surface can be worked on immediately after metallizing.

Metallized surfaces under normal conditions will not chip, crack, flake, or scale. Metallizing can be used as a preventive measure against rust and corrosion on storage tanks, water towers, bridges, filter beds, gates in reservoirs and dams, motor boat and barge hulls. Such equipment metallized over 20 years ago is said to be in perfect condition, and should last another 25 years.

Preparation of the Surface

Preparation of the surface to be metallized is important to insure a proper bonding of the sprayed coating and the base material.

The base material must be roughened to form keys or openings for the sprayed material to penetrate, thus binding or keying the two metals together.

The base material must be clean and free from oxide, oil, water, or any other foreign substances which might form a layer between the sprayed metal and the base material.

The sprayed metal must be finely atomized so that the molten particles are small enough to penetrate the smallest openings in the prepared base material and so bond to it.

Blasting Materials: Sand is recommended for all work where the blast material cannot be recovered, such as on tanks and other large structures. The sand used should be a good grade of hard (preferably silica or flint) angular wash sand from 16 to 20 mesh size. The degree of roughness depends upon the mesh size and the sharpness of the sand. Round (beach) sand should not be used. If sand which is too fine is used, the result will be a clean surface, but one which is not properly roughened. The use of a sand coarser than recommended will give satisfactory results but will make the blast cleaning operation slow and expensive. The sand must always be dry. Sand may be recovered and used again, provided it is screened and the fine sand and dust removed before re-using.

Steel grit, or Metcolite, being tougher than sand, is the best material for blast cleaning and is recommended for all work where the blast material can be recovered. It can be used over and over again, which results in lowered costs.

Air Pressures: For all sand or grit blast work on metallic surfaces, except where there is danger of warping the base material, air pressures of 80 to 100 pounds per square inch are recommended. The use of lower pressures will result in poor, inefficient, and costly blast cleaning. Where Metcolite is used, air pressures between 35 and 65 lbs. are best, depending upon the type, part or material being blasted.

The air for blasting should be free from oil and excessive moisture. If the air is oily, the steel grit soon becomes coated with oil and transfers to the base material, making it unsuitable for metallizing. If the compressed air used for blasting is wet, the grit will rust, resulting in no bond between the sprayed and base metal.

On the Long Beach holders, steel surfaces to be metallized or painted were completely cleaned of all paint, scale, corrosion products, and other foreign matter in order to expose bare steel sufficiently rough to assure adherence of the sprayed or painted coating. Dust was blown off with moisture-free air.

Surfaces were prepared by blasting with sand. Care was taken that blasting materials were not used in which the angularity of the particles had been impaired by rounding the edges of the grain.

The air for blasting had a minimum pressure of 90 pounds per square inch and was filtered to insure its freedom from suspended moisture or oil. Where

(Continued on page 46)

Outdoor Meter Settings Standardized For Homes without Basements

By D. M. Steen and R. D. Davis
Long Island Lighting Co., Mineola, N. Y.

THE western section of the Long Island Lighting system's operating area in Queens and Nassau Counties extending eastward from the New York City line approximately 30 miles, was experiencing a boom in the construction of small homes prior to World War 2. Diversion of construction materials and manpower for military requirements slowed down this type of building, but mushroomed the expansion and construction of industrial plants, particularly those manufacturing military planes and their equipment. Expansion of these industries brought additional labor into the area which created a more acute shortage of housing facilities.

With the end of the war and the release of materials for normal requirements, the construction of small homes proceeded at an accelerated rate.

The need for homes for men discharged from the military forces became most acute. Builders found that costs were so high that to build the conventional home with complete cellar brought the selling price above that which the average "GI" could afford. The most practical solution which was adopted by many builders was to construct the cellarless home.

One developer, Levitt and Son, with a successful experience in the construction of thousands of conventional homes on Long Island, pioneered cellarless homes. Gas was the fuel selected for cooking, hot water, and heating in these houses. The design became popular with other builders who constructed homes of similar design in smaller developments.

Mr. Steen is manager, Gas Transmission and Distribution, and Mr. Davis is superintendent, Gas and Meter Shops.

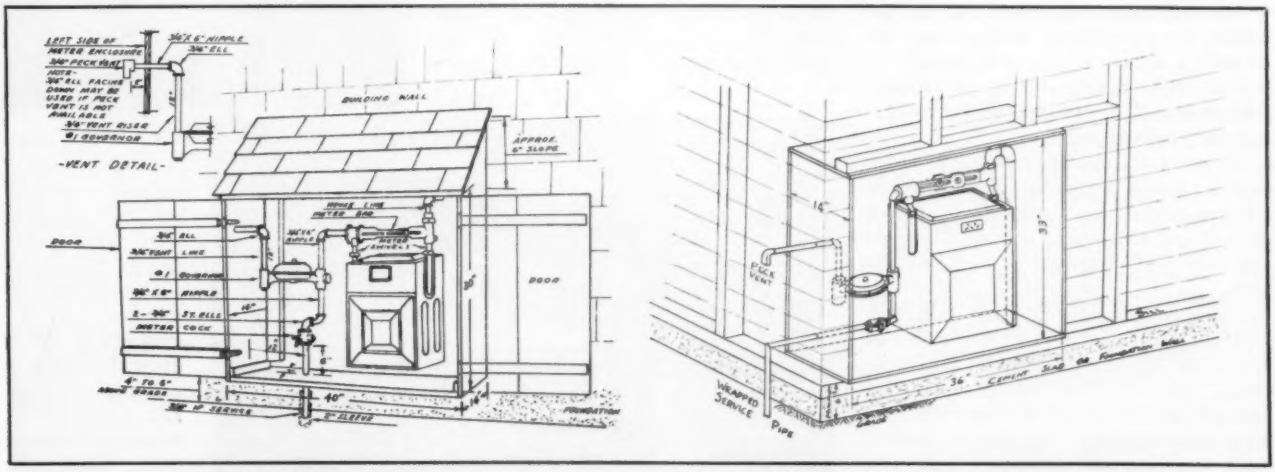
The cellarless home, as built on Long Island, is a bungalow with about 25 x 32 ft. floor area, providing space for two bedrooms, living room, kitchen, bath and stairway to an expansion attic. The house is set upon a concrete slab poured integral with footings extending around the outer edges of the slab and three feet below the slab into the ground.

The utilization of space inside these homes precluded the placing of the gas regulator and the meter installation inside the house. Considerable study was given to the matter of inside installation, but no solution could be found which did not involve concealment. This was impractical and unsafe. Consequently, a decision was made to standardize on an outdoor regulator and meter enclosure.

Having made this decision, Long Island Lighting Co. developed a standard outside enclosure to be built and paid for by the builder. The cost to the builder is less than $10.00 each. Sketch 1 shows detail of construction and installation. The regulator is a 3/16 in. orifice, dead-weight type and is weighted for 4.5 in. w.c. outlet pressure. Meter is standard tin case construction. Picture "A" shows this enclosure as it appears at the side of the house.

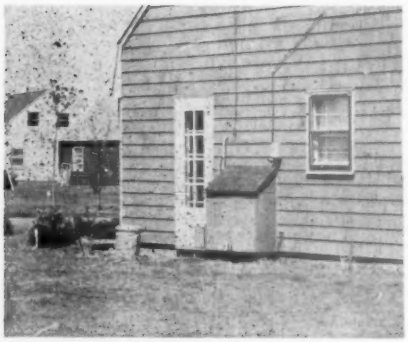
Several hundred of these installations were made starting in 1947. A careful record was kept of service difficulties in these outside enclosure installations. No difficulties traceable to outside locations were experienced until we had the coldest day in the 1947-48 winter. When temperatures ranged between 1° F and 9° F, two failures occurred. Investigation showed that the service pipe was exposed more than the recommended six inches between the ground and the bottom of the enclosure. Ice had formed in the exposed section of pipe with small pieces passing through the regulator orifice, lodging under the governor seat, and resulting in a seal blow.

Prior to this standardization, we had outside meter installations. However, there was no standard pattern. No se-



Sketch 1—Outdoor meter box

Sketch 2—Flush type meter enclosure



Picture A—Outside meter enclosure

rious difficulties were encountered. Where exposure had been very severe, resulting in the regulator freezing shut, the installation of an electric light bulb provided sufficient heat to remedy the trouble.

About a year ago, many of the owners of these homes began to do something about the open space between the house and the detached garage. These improvements ranged from building an ornamental fence between the house and garage to the widest variety of breezeways, both closed and open. Others constructed additions such as a porch or a garage built into the house. Picture "B" shows what was done with one house.

Many of these improvements automatically resulted in making the gas installation unsafe. Regulator vents were completely blocked or could not be removed to change the regulator because of ornamental fences. In other cases involving breezeways or porches, the gas installation was completely housed so that a seal blow would vent gas inside the premises. Thorough surveys were made and home owners were notified in writing to extend the vents to the outside. We experienced no difficulties getting the full cooperation of the owners in relocating regulator vents.

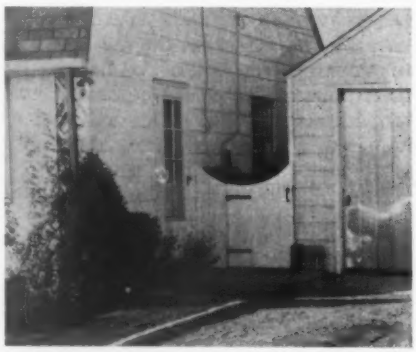
The sketches show vertical service piping to be sleeved. Sleeves are not currently being used. Investigation by our electrolysis engineering department has proved that wrapped pipe provides superior protection.

To meet the objection to the outdoor box extending entirely on the outside of the house, we have developed a flush type enclosure. Sketch 2 shows the details of construction and installation.

Pictures "C" and "D" show this flush type enclosure as it appears at the side of the house and in contrast with the house itself. The wrapped service piping is clearly pictured as well as the Peck vent and aluminum tag. This tag is stamped with the distances from the left and right boundaries of the house to the curb cock location. The tag is a part of our standard high pressure service installation. It provides the information necessary to locate the curb cock readily when a curb box is below grade or snow covered.

We do not have the costs involved in building this flush type enclosure. This builder preferred the flush type to the exposed box type, and the installation was made to our specifications by the builder at his expense. He showed no concern about the cost of construction.

Our company now requires outdoor meter boxes for all electric meter installations regardless of the type of construction of the house itself. Currently no electric meters are being installed in homes having cellars. The housing of electric facilities is obviously much simpler due to their smaller volume and greater adaptability to a compact installation. Our box type gas meter and regulator outdoor enclosure is not ideal. We are mindful of its bulkiness and realize that it does not enhance the appearance of the house. The flush type is partly the solution. A study is now underway with a view towards compactness without sacrificing serviceability.



Picture B—Top of outside meter enclosure is barely visible

In some meter reading areas, where gas meters are located in the cellar, skipped readings are as high as 50 per cent. This situation is due in a large measure to the great numbers of married couples going to business. Outdoor meter installations are the practical solution to this problem.

The question of the difference in metered consumption between cellar and outdoor meter installations frequently has been discussed. Our search for data on this subject has been unsuccessful. Should there be test data, its publication would be welcomed by the gas industry.

It has been our experience that the outdoor gas meter and regulator enclosure provides a maximum in safety, accessibility, serviceability, and ease in meter reading.

PUAA Will Hold Convention At Kansas City, May 11-12

Kansas City will be host to the Public Utilities Advertising Association's national convention, May 11 and 12, according to President Floyd Fairman, of Lexington, Kentucky.

"We greatly appreciate the invitation of the gas and electric companies of Missouri and Kansas," said Mr. Fairman. "With 350 members scattered in almost every state of the union and many foreign countries, selection of this central location will help make the 1950 convention the largest ever held."

The convention program will feature addresses by utility executives, discussion groups, and displays of top utility advertising. Also included will be the "hell-box" session, an informal gathering for discussing grass roots advertising problems.

Pictures C and D show flush type of outdoor gas meter enclosure. Above, it is shown open; below, it is closed.

Shifting FPC Viewpoint Obscures Intent of Natural Gas Act

By Burton N. Behling

Legislative Reference Service, The Library of Congress

THE preceding chronicle of legislative and administrative developments indicates the atmosphere in which the matter of whether prices received by producers and gatherers for gas in the fields should be fixed by the Federal Power Commission. In their representations the advocates of such regulation predicted large future increases in the field prices of gas, unless subjected to utility price fixing, and they also referred to a substantial concentration of holdings of gas reserves as indicating a possible threat to the continued preservation of competitive conditions in the production and sale of gas. It was not contended, however, that monopolistic conditions, abuses or practices now exist. Neither does the record reveal that any anti-trust proceeding with respect to natural gas holdings has ever been instituted or sought under established laws and procedures.

That substantial concentration exists in many industries and that such concentrations can present important problems is widely recognized. But if some degree of concentration of natural gas reserves were considered to require commodity price controls over natural gas sold at arm's length in the fields, such a criterion would also seemingly require price controls over many of the nation's major industries and basic commodities, such as steel, coal, oil, aluminum and motor vehicles, to name only a few. In many other instances, there appears to be substantially greater concentration of production and capacity than there is in the case of natural gas. Some of these others, too, such as coal for example, are to a large extent the raw material or facility basis for what are classed as public utility services. What the effects upon the nature and the functioning of the economic system might be if systems of price fixing were imposed wherever a substantial measure of concentration were shown to exist presents questions of great import to the whole economy. Many economists as well as others, no doubt, would seriously question the wisdom of adopting or pursuing such a course.

Part 2 of a paper presented at a meeting of the American Economic Ass'n, New York, Dec. 29, 1949.

Field Price Conditions

For perspective, a word also needs to be said about field prices for gas in the major Southwest area, both historically and in relation to the charges which utility customers pay for natural gas service. By almost any conceivable standard such gas has been cheap. This condition, to state it briefly, resulted from (1) large and flush supplies usually brought forth as an incident of the intensive search for and production of oil and (2) the rather slow development for many years of sufficient

Part 2

Part 1 appeared in the February issue of AMERICAN GAS JOURNAL.

market outlets for the available gas reserves. Until quite recently with the development of more balanced supply and demand conditions, gas was virtually a drug on the market in the southwest. These circumstances also largely explain why such great volumes of gas have been blown or flared to the air in the producing areas. The early history of field prices in other gas-producing areas, such as the Appalachian, shows a generally similar pattern.

Under the conditions which existed, oil had to bear almost the entire brunt of the joint costs of searching for and developing these two associated resources, with gas in the economic role of an incidental by-product. If the position is taken that for some reason the very low prices which accompanied the early development of gas resources in the southwest should somehow be restored, the question presented is why oil should continue to bear nearly all of the associated exploratory, developmental and production costs. Relatively lower field prices of natural gas would require relatively higher crude oil prices in order to induce and sustain the vigorous exploratory and production efforts which are essential to the needs and interests of the entire nation.

Taking account of conditions, past and present, recent advances in the field prices of southwest gas are not surprising, but neither is there basis for alarms that they are attached to some kind of sky rocket. According to the latest available data[36] the average price at the wells for southwest gas was still below five cents a thousand cu. ft. in 1948, and consumers will continue to benefit for many years from prices specified in long-term supply contracts which are characteristic of the natural gas industry. Even though recently negotiated contracts specify prices which are substantially higher than those made years ago when conditions were different, they frequently contain "escalator clauses" and other features limiting future price increases to about one cent per Mcf at five-year intervals over the next 20 years.

Predicting the course of field prices far into the future is subject to the usual hazards of economic forecasting. Much will depend upon the continued development of additional reserves and the maintenance of an economic climate favorable to active exploratory, developmental and conservation efforts by gas and oil producers. At present, the estimated proved reserves of natural gas amount to about 175 trillion cu. ft.,[37] or somewhat more than the proved reserves of oil, and have been increasing year by year more rapidly than production and consumption. In 1948, accretions to proved reserves were more than double the production of gas and promising discoveries were made in Wyoming, Colorado, West Virginia, and Virginia, as well as in the predominant southwest producing areas. As long as such favorable conditions continue, there would appear to be no

[36] *US Bureau of Mines.*

[37] *American Gas Association.*

genuine basis for alarm about gas supply and field prices, even though demands are increasing rapidly also.

A look backward is likewise instructive. In 1938, it was estimated that the total proved gas reserves in the United States amounted to 66 trillion cu. ft. With the production of 40 to 50 trillion cu. ft. since that time, it would be indicated that, without further accretions to reserves in the meantime, the nation's resources of natural gas would now be nearly exhausted. This, of course, has not happened and existing reserves are now greater than ever before.

Field Price Small

It is also important to bear in mind that the price in the field accounts for a very small part of the charges paid by residential and other small consumers of natural gas. Transportation and distribution charges, which are regulated by federal and state agencies, respectively, are the major elements in such charges. The average field price of southwest natural gas, which as noted above was less than five cents per Mcf in 1948, compares as follows with the average prices paid per Mcf by residential customers in these large consuming States: Indiana, $1.02; Michigan, $0.86; Ohio, $0.61; and Pennsylvania, $0.61.[28] For large industrial users of natural gas, whose rates are generally much lower than those paid by residential consumers, field price is a greater factor in the delivered price. For this reason and also because such industrial users consume the greater part of the natural gas which moves through interstate lines, it appears that their rates would be principally affected by any future adjustments which might be necessitated by higher field prices.

The group within the Federal Power Commission advocating price control of producers and gatherers of natural gas also explained how it would be applied. Their purpose was summed up in the proposition that "we are not talking in regulation about what the commodity is worth. We are talking about regulation, as nearly as possible, on a cost basis."[29] It was further asserted that the discovery and production of natural gas are "susceptible of regulation on the same principle as is applied to the production properties of an electric utility."[30] In these and similar statements there was no recognition of the basic difference that electric energy is manufactured by man, in contrast with natural gas which is discovered in nature under speculative and extremely variable conditions, and which has a value bearing little or no relationship to specific discovery and production costs.

As noted previously, the Federal Power Commission has never, up to this time, attempted to control the field price received for gas by an independent producer or gatherer. It has done so, however, in the case of integrated pipe line companies which have production and gathering operations. In such instances, the Commission has not distinguished the production and gathering operations from the transmission properties, instead joining them all together in the same "utility" rate base and allowing a specified rate of return on the net depreciated original cost.

Since the Natural Gas Act provides no standard for the Commission to follow in such instances, the Supreme Court has held in closely divided opinions that, as a matter of law, the Commission is neither precluded from nor required to apply the original cost-rate base method to the gas production of natural gas pipe line companies in the process of fixing their interstate wholesale rates. In the leading case specifically concerned with this matter,[31] a bare majority of the Court upheld the Commission's rate order because it did not exceed the statutory authority under the Act. As applied to the production of gas, however, five members of the Court sharply attacked the Commission's rate-making method.

Commodity Value

Subsequently, in the report to Congress on the Commission's Natural Gas Investigation to which Commissioners Smith and Wimberly subscribed, the following conclusion was stated in regard to this matter:

"Application of the net original cost formula to such gas production, as though it were a utility function, is not consistent with the peculiar features of natural-gas exploration, development and production. A standard of fair field price or reasonable value, which will make appropriate allowance in each instance for the value of such gas as a commodity, should instead be adopted and applied, subject to necessary safeguards against abuse."[32]

Under the Commission's cost formula, the interstate pipe lines which produce some of their own gas have received relatively small allowances for it in rate proceedings, especially where the properties were acquired or developed many years ago and the original investment has been largely charged off to depreciation and depletion. Strictly speaking, the producer is allowed nothing for his gas as such, but only the cost of producing it as calculated under the formula.

This procedure, if continued, may bring about important changes in the structure of the natural gas industry. It is significant that in recent years no new interstate pipe line has been built with its own reserves attached. Instead, required gas supplies have been engaged entirely on the basis of purchase contracts with independent producers. Moreover, some of the existing integrated pipe lines have been taking steps to divorce or segregate their production properties from their transmission operations. In what may prove to be a very influential decision involving undeveloped gas acreage (*Federal Power Commission* v. *Panhandle Eastern Pipe Line Co., et al.*), the US Supreme Court on June 20, 1949, denied the authority of the Commission under the Natural Gas Act to control the disposition of gas leases by a natural gas pipe line company and made this pointed observation:

"If the Commission is of the opinion that it should have power to control the disposition of gas leases by natural gas companies, it is authorized to call the attention of Congress to that fact."

It was only a short time before this that a majority of the Federal Power Commission had insisted before congressional committees that the Commission has the authority to extend its price regulation to include all producers and gatherers who sell gas to the interstate pipe lines and had threatened to go ahead with such regulation on a utility basis.

Specific Examples

The basic question is whether such utility regulation would be suitable for application to the highly speculative and unpredictable enterprise of exploring for, finding, developing and producing a resource of nature such as natural gas. The proposed procedure would have some weird results, such as the following illustrations will suggest:

1. If two producers had the same investment outlay but the first happened to discover much more gas than the other, the price fixed for the gas of the one would be much greater than for the other.

2. Two producers may discover the same amount of gas, but one of them may have a higher discovery cost than the other, depending upon the different conditions encountered in prospecting and drilling.

(Continued on page 44)

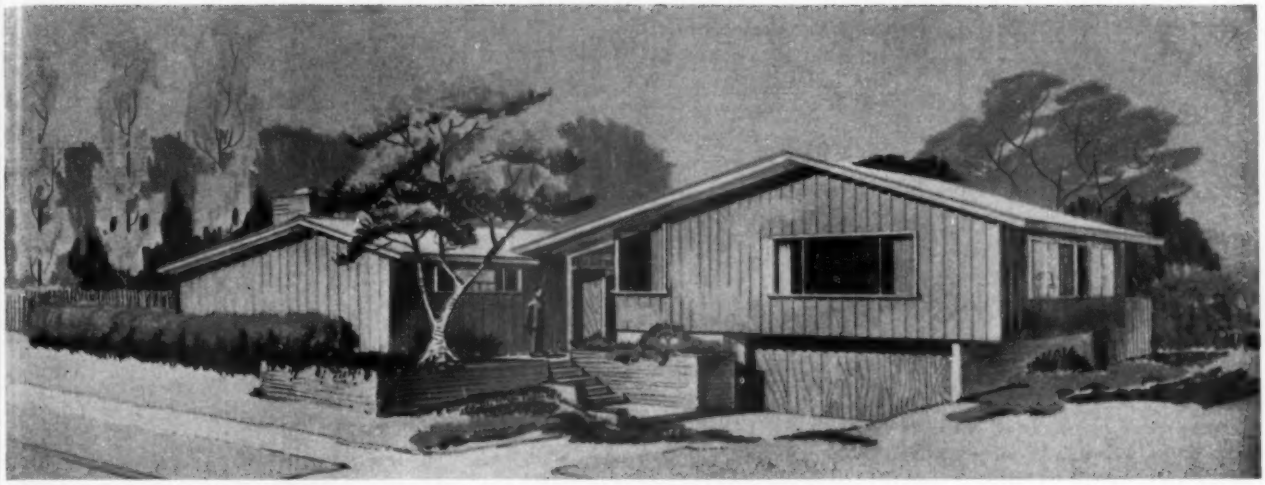
[28] *US Bureau of Mines.*

[29] *Testimony of Leland Olds, Hearings on S. 1498, p. 241.*

[30] *Same, p. 296.*

[31] Canadian River Gas Co., *et al. v.* Federal Power Commission, *324 US 581 (1945).*

[32] *Federal Power Commission, Report of Commissioners Nelson Lee Smith and Harrington Wimberly, Natural Gas Investigation, Docket No. G-580 (1948), p. 10.*



Southern California Gas Co. Participates In Student-Designed All-Gas House

THE "VILLAGAIRE", a $16,500 student-constructed, ranch style, all gas home located in the Baldwin Hills section of Los Angeles is paying promotional dividends for the Southern California Gas Co. The home, completed in early January, will be on public exhibit until April 15.

Jointly sponsored by the gas company, a finance company, a real estate firm, a department store and a building contractor, this attractive, medium-priced home was designed and built by a team of four senior students from the School of Architecture of the University of Southern California. Basic idea behind "Villagaire," according to Dean Arthur B. Gallion of the architectural school, was to afford students an opportunity to relate theory to practice. The house was completed in early January, and will be visited by an estimated 50,000 people.

The fact that the project was originally designed as an all-electric house challenged the Southern California Gas Company's builder-architect sales department to the extent that the home was redesigned as an all-gas home with a new freedom gas kitchen. Modern gas appliances installed in the home include a "CP" gas range, an automatic gas storage water heater, a Servel refrigerator, and a forced air furnace.

The California Federal Savings and Loan Co. furnished the lot and financed the construction; Walter H. Leimert Co., realty developers, rendered advice and assistance during the building. Barker Brothers furnished the home. Art A. Smith was the building contractor.

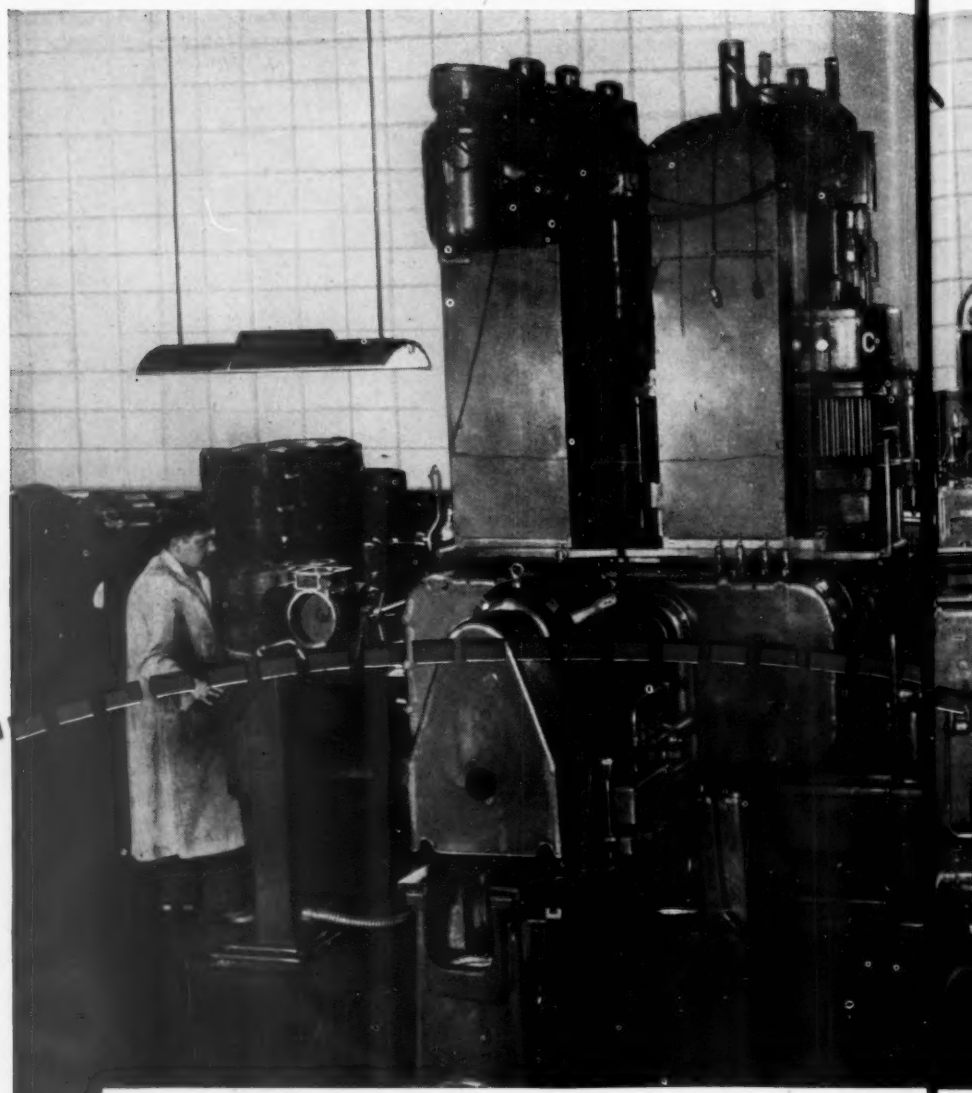
From the standpoint of the gas utility, the project has been an effective promotion in a number of ways:

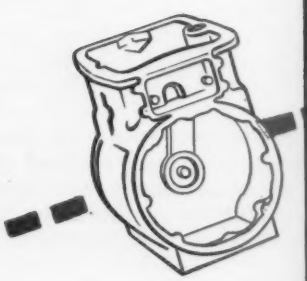
1. The company designed and installed a large sign, which not only listed the cooperating sponsors, but called special attention to the gas kitchen.

2. In addition to this on-the-spot publicity, the novel idea behind the construction of the home brought ex-

(Continued on page 48)

The illustrations on this page show: top, architect's drawing of the student-designed home; bottom left, the sign which attracted attention; and, bottom right, the featured all-gas kitchen.





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"American" know-how designed the machine. "American" know-how supervised its construction. The meters which benefit from its super-accurate positioning of drills and taps inherit the know-how to give superior measuring performance—for year after year of service.

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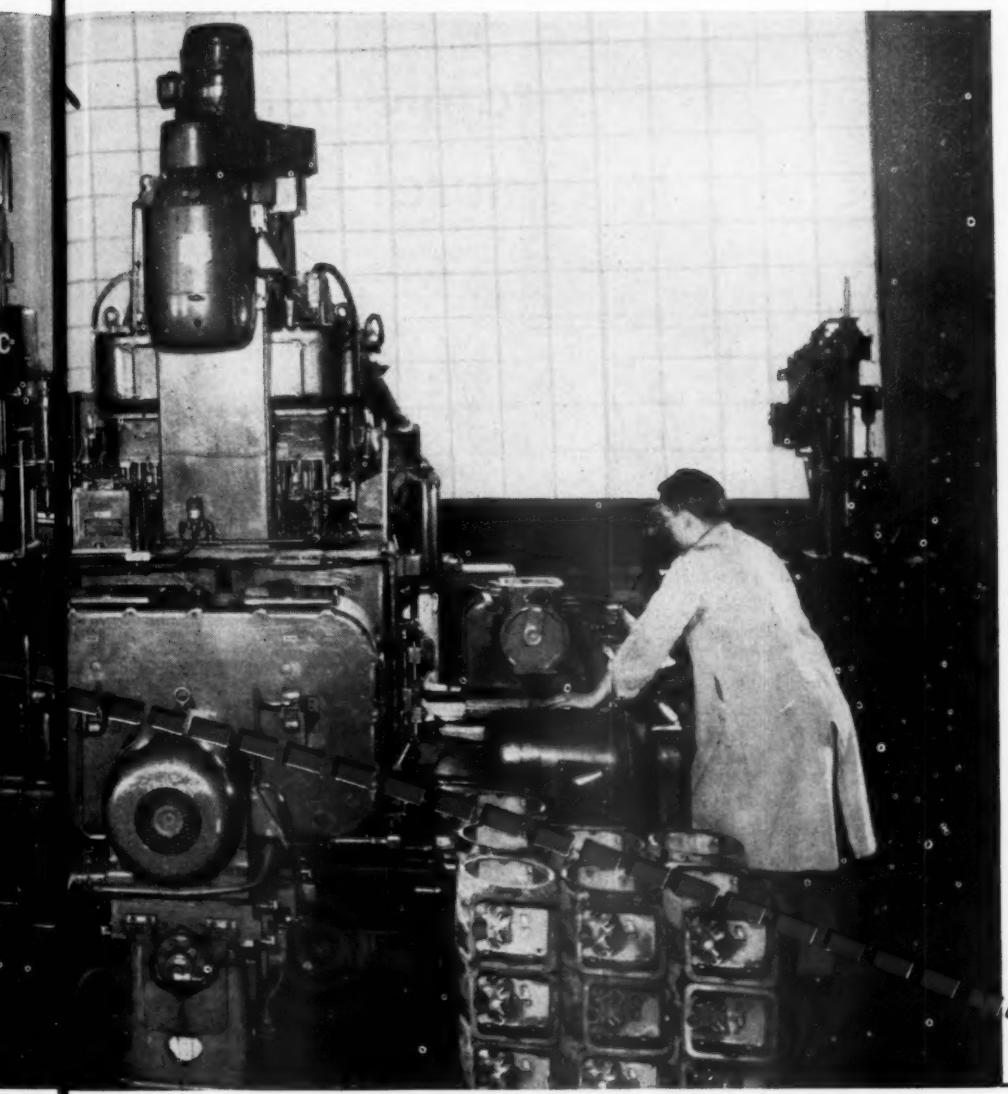
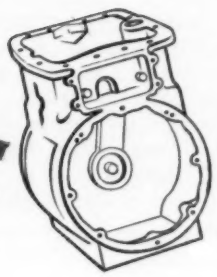


MORE THAN 100 PRODUCTION TOOLS *mill, drill and tap meter bodies which are held rigidly in moving fixtures. This new American Meter Company process provides undeviating accuracy for the positioning of the sub-assemblies which follow.*



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G MEANS PRECISION PERFORMANCE

Problems Presented by Ceramic Burners When Converting to Natural Gas

By H. K. Richardson

CERAMIC burners are made by several manufacturers, and are used alone or in conjunction with ordinary types of gas burning equipment. This article reports on experience with some of these burners and the problems encountered when changing the fuel used from manufactured to natural gas, giving fundamentals of burner operation and general details.

Ceramic gas burners are used in many heating installations burning either in the open or enclosed in furnaces or lehrs. Their use is a specialized branch of combustion engineering. When conversion or change of gas is made on an existing installation, best results are obtained by frankly telling the customer what to expect from the change, when to expect it, and then helping him to get the proper information from the manufacturer pertinent to the specific installation.

The basic effects of flame propagation and temperature of burning mixtures as brought out in a previous article (Oct. 1949, AMERICAN GAS JOURNAL) for glass working burners hold for ceramic burners. Also, the fact that it takes a longer time with natural gas than with manufactured gas to do a job holds for the ceramic burners as it does for the metal type of burner. In one instance, the same burner on the same job with the same Btu release required 14.2 seconds to do a job on natural gas and only 13 seconds on manufactured gas.

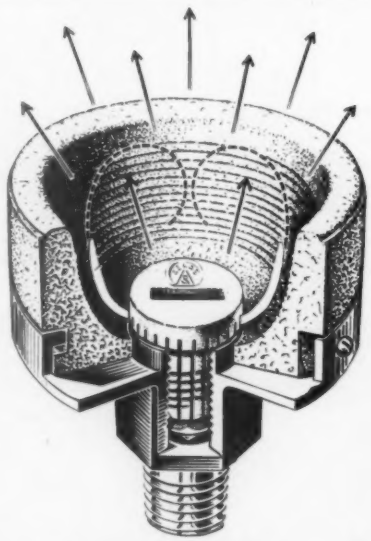


Fig. 1—Ceramic radiant cup burner for open firing—Cut away view of manufactured gas type. Dotted lines indicate combustion products. Arrows, path of heat rays.

This discussion will be limited to four representative types of ceramic burners, as follows:

(1) Radiant cups
(2) "Superheat"
(3) Refractory screen-tunnel type
(4) Spearpoint

Illustrations of each type are given here to simplify the discussion of the details of operation, their commercial application, and the changes needed when changing the type of gas supply. The gases considered will be limited to manufactured gas, natural gas, and their mixtures (raw or reformed).

1. Ceramic Radiant Cup Burners

There are two general types:

For open firing; such a burner is shown in open section in Fig. 1. In this burner the gas-air mixture is burned against the side of the cup, bringing it to incandescence, and this in turn radiates heat to the work. The products of combustion become highly heated and add to burner efficiency.

For enclosed firing, such as inclusion in furnace walls, the above type is modified by providing a longer supply pipe for the gas-air mixture. This tip holder is of metal for low temperature and of ceramic for high temperature work. Fig. 2 illustrates this type of burner.

The effect of different gases upon the cup shape or contour and the tip construction of these two is quite marked. These differences and their relation to conversion from manufactured gas to natural gas are noted below.

Open type burners—The difference in flame propagation of natural and manufactured gas requires a different

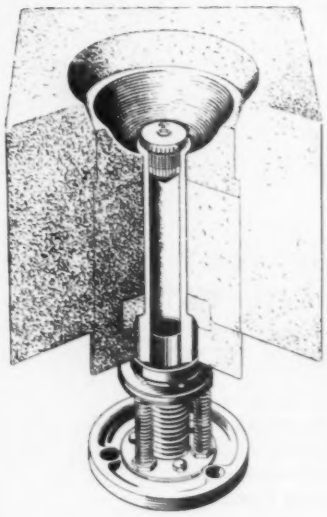


Fig. 2—Ceramic radiant cup burner for enclosed firing—ceramic tip holder for high temperature work.

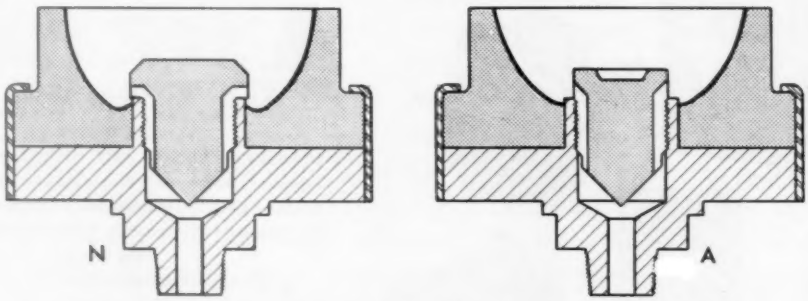


Fig. 3—Ceramic radiant cup burners—Typical sections of cup and tip—(Left) N for natural gas (Right) A for manufactured gas.

cup contour and tip shape for each gas. These differences are illustrated for a 2-7/16″ diameter cup in Fig. 3. Note that the cup for natural gas is deeper and the tip directs the burning gas-air mixture against the cup, so that a longer burning time and area are available to the slower burning gas. The shape of the cup increases in importance as the percentage of methane in the gas increases.

The open cup type is made in several sizes; the largest number are of a 2-7/16″ opening. In case of this size, there are three modifications of cup contour and two variations of tip construction in use. These variations were made to meet practical operating conditions and their intelligent use meets practically all needs. These modifications are shown in detail in Fig. 3. The right hand burner designated A is made for manufactured gas. This is the original design and is satisfactory for the usual range of manufactured gases.

The left hand burner designated N is made for natural gas. The N type cup is made with two slightly different contours, since gas with a very high percentage (93%+) of methane requires a slightly deeper cup. When a natural gas is stripped of its propane and butane content leaving a gas of 93%+ methane and the rest inerts, it is much harder to handle than the original gas, requiring the cup modification as noted above.

Smaller sized open cup burners of about 1-⅞″ cup opening, due to smaller size and rating are made with a cup contour and tip construction that allows of their practical use on all gases without modification.

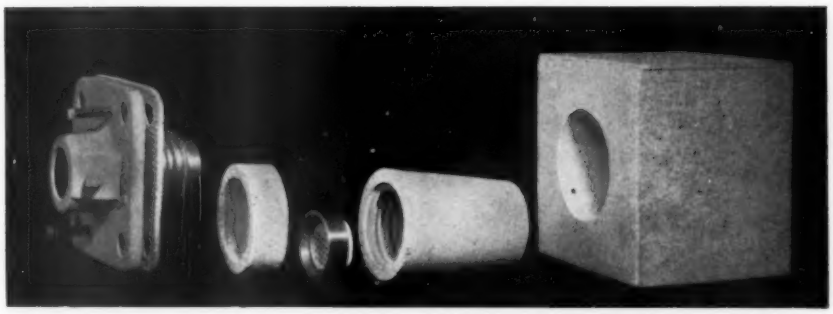


Fig. 4—Refractory screen burner—Exploded view. Note perforated ceramic burner block or disc.

In burners larger in size than the 2-7/16″ cup opening, it is necessary to observe all the modifications above noted for the 2-7/16″ burner.

Burners in enclosed work—Burners in enclosed work are assisted in their operation by reradiation from the furnace, so that one cup shape is used for all gas compositions. The tip must be changed to suit the gas used. Also in the case of the all ceramic burner (i.e. both cup and tip holder are of ceramic) the tip position must be changed with the gas, for it has been found in practice that the tip must be inserted slightly further into the cup, the higher the percentage of methane in the gas. This means that the length of the tip holder must be made to fit the gas used.

Burners operating on natural gas require slightly more Btu than on manufactured gas to do the same work. This loss between five and ten per cent is so small that it can easily be made up by a slight increase in the burner head pressure.

Burners in enclosed operation are capable of greater Btu release and cup temperature than the same burner in open operation due to the effect of reradiation from furnace wall and the charge. For example, a burner that would operate in the open at a maximum burner pressure of 40″ wc and have a cup temperature of about 2300° F. can be operated at 80″ wc in an enclosure and have a cup temperature of about 2850° F. Also it would have 41 per cent more Btu release in the enclosed operation because of the higher burner pressure that can be used and the burner still stay lighted.

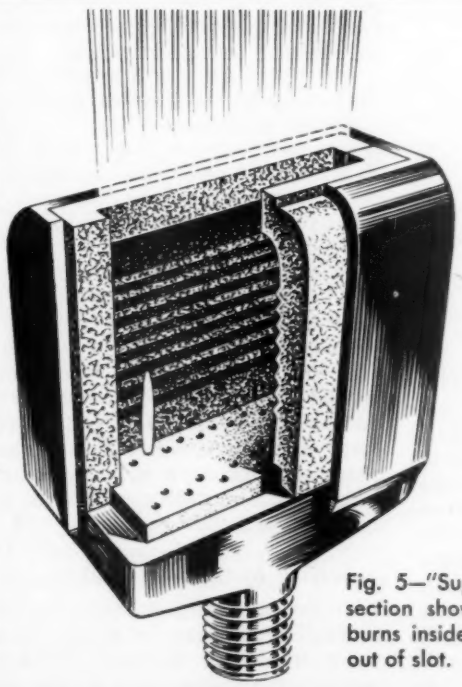


Fig. 5—"Superheat" burner—Cutaway section showing way gas-air mixture burns inside ceramic and flame blasts out of slot.

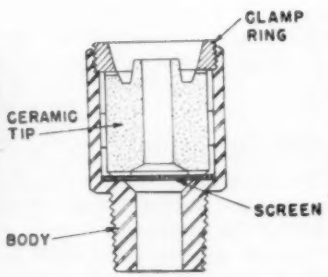


Fig. 6—Spear point burner.

2. Superheat Burners

These burners are shown in cutout view Fig. 5. The gas-air mixture is burned within the burner, heating the ceramic wall which serves to superheat the gas-air stream. The useful temperature of the issuing flame can be approximately 300° F. hotter than that of a flame from an open burner of the best construction.

There are two general types of these burners: (1) with blast opening, a slot, and (2) with the blast opening, a round hole. The sensitivity of the different size burners to blow off at high burner mixture pressures on natural gas is greatest in the narrow slot ⅛″ x 1″ (area 0.125 sq. in.) and all the round burners ⅜″ diameter and under. In these sizes the burner pressure at blow off when using natural gas is about one-half that for manufactured gas. This reduces the Btu release by about the same proportion. Burners with slot areas of larger than 1-⅛″ x ⅛″ (area 0.141 sq. in.) are universal burners.

3. Refractory Screen Burners

This burner shown disassembled in Fig. 4 consists of a ceramic burner screen containing a multiplicity of ports. The flame burns into a refractory tunnel which serves to preheat the gas-

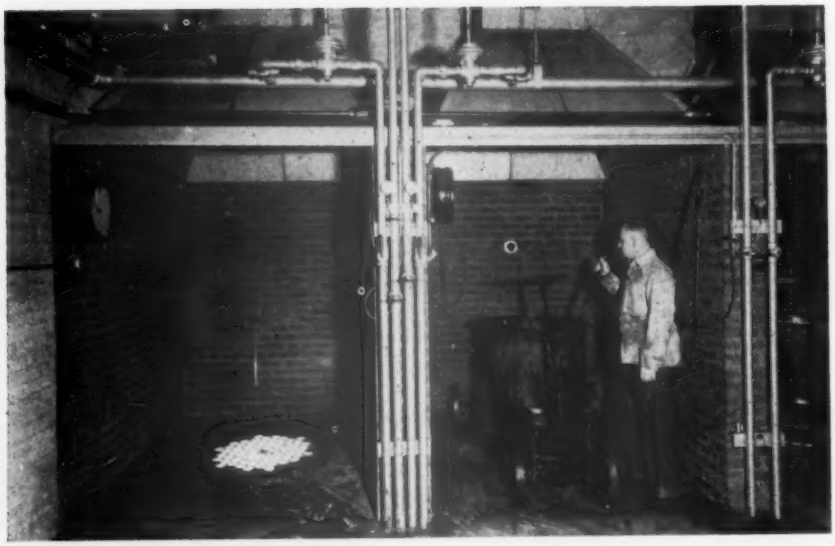


Fig. 7—Varnish making using radiant cup burners. Left—open setting ready for pot. Right—pot in operating position.

air mixture and superheat the flame as the refractory surface becomes hot.

A refractory screen burner operates on all gases. Approximately the same heat release, Btu per burner at same burner head pressure, can be obtained from all gases. However, there is a vast difference in the character of the flame obtained when using slow burning natural gases than that obtained from manufactured gas. As an illustration, in a burner operating at 3″ wc on manufactured gas, all the ports had well defined cones and the flame was confined in the ceramic tunnel heating it up properly; no cones came out of the tunnel end, only a uniform blast of flame. When this burner was changed over to natural gas at the same 3″ wc burner pressure, there was the same Btu release but a vastly different flame. The flame had a long single cone. The flames had lifted from the burner screen and combined as one. While the heat release was the same, the temperature of the flame was lower. When the burner head pressure was dropped to about 1½″ wc, the natural gas flame burned with cones from each of the burner holes and the flame characteristics were almost the same as for the manufactured gas, but the Btu release was only 60 per cent that of the manufactured gas at the higher pressure.

This indicates that each conversion job where this burner is used must be individually appraised. If the flame characteristic is of no importance, then the conversion can be made with no burner change. If the flame characteristic in use with the manufactured gas must be preserved and the same Btu release required, then either additional or larger burners must be installed when changing to natural gas. In case of mixed gases, each job must be separately analyzed.

4. Spear Point Burners

These burners, illustrated by Fig. 6, are a minor member of the ceramic burner family. The flame burns from a perforated ceramic block held in a metal casing. They burn well on any type of manufactured gas. On natural gas, the small hole burners of this type are subject to all the difficulties encountered when burning this gas in small hole unpiloted burners. (Oct. 1949, AMERICAN GAS JOURNAL).

In any change to mixed or straight natural gas it may be necessary to change over to the metal type of piloted burner discussed in the article noted above, the first of this series. The trouble becomes magnified the higher the methane content of the gas, so each installation must be individually evaluated by the burner engineer to make the change intelligently and economically.

Typical Installations

The handling of the conversion problem in a few industrial applications will point up the method of attack.

Varnish Making—An open installation of ceramic cup radiant burners is shown in Fig. 7. Here hexagonal burners with 2-7/16″ cup opening are nested together and serve to heat the bottom of a varnish pot. At the left will be seen the lighted burner in its floor setting. At the right is the operation at work.

The control of the burner is interesting. In part of the process the burner is operated at a burner mixture pressure of about 8″ wc; it is subsequently turned down low to about ½″ wc burner head pressure for a period. This variation in the pressure used must be noted and has a very marked bearing on the conversion process.

Suppose a unit is operating successfully on manufactured gas. The burner will be of the assembly A, right side of Fig. 3 and will take the required turndown without trouble.

If it is required that the unit be operated on straight natural gas, the burners will be changed to Assembly N, left side Fig. 3, and it will operate on this gas with the required turndown nicely.

If the unit is required to operate on a changing mixture of mixed natural and manufactured gas send out, then the question of the back fire on low turn down becomes of paramount importance. In this case the usual practice will be to use the N shape cup Fig. 3 to take care of the lower flame propagation. An A type Fig. 3 tip, (i.e. manufactured gas type) must be used since the turn down is below 1½″-2″ wc, the point at which a natural gas tip will backfire on manufactured or mixed gases. In this change over to either combination, there will be a slight loss in Btu release which can be overcome by a slight increase in the burner head pressure.

Lehrs or Furnace Operation—These as a rule present no problem to a conversion job. As noted before, the only requirement is to change the tip from a manufactured gas type A Fig. 3 to the N type Fig. 3. In case of the ALL-ceramic burner, the tip holder must be changed. A longer holder must be used on the natural gas, setting the tip further into the cup. A discussion of the application of ceramic burners to the problem of glass working will be found in Reference 1.

Selective Heat Treatment of Metal Parts—The use of superheat burners to limit the high temperature area in a hardening process is illustrated in Fig. 8. Here the heated area is confined to the spot that requires the processing, so selective *hardening* is accomplished in the constricted area.

In this case the shift from manufactured gas to natural gas causes but little trouble. Only in case of the very narrow slot burner with its low blow off point will difficulty be encountered. In this case it is easily overcome by adding additional burners until satisfactory performance is obtained. A comprehensive discussion of the application of ceramic burners to metal heating will be found in Reference 2.

Supplying Mixture to Burners

There are six recognized methods of mixing air and gas for use in burner work. These are discussed and compared in the article by D. A. Campbell

in Reference 3. In general, only two are customarily used for the most exacting applications of ceramic burners. A brief summary of the operation of these follows.

The Combustion Controller-Premix System—The complete premixing of the gas and air and supplying it under compression to the burners is the preferred method for ceramic burner operation. Here both the gas-air ratio and the burner pressure can be independently controlled and are independent of each other. Burner pressures up to 80″ wc are possible, and any gas-air ratio found desirable can be set up and carried on.

The Zero Governor Low Pressure Inspirator Set—Here the gas is reduced to atmospheric pressure and fed to a Venturi mixer. The air is under blower pressure and draws the gas into the air stream making the gas-air mix in the Venturi mixer. The mixture is fed from the Venturi to the burner manifold. The Venturi serves as both a mixing arrangement and a pressure making device. Gas control is by a valve in gas line. Valve in air line governs quantity of mixture and pressure at the burner manifold. The available burner pressure varies as the air pressure used, being approximately 1/3 that of the air, i.e.: If 4 psi air pressure is available—a burner pressure of around 35″ wc can be obtained.

The effect of conversion on these two systems is similar and the change over to natural gas is made with little difficulty. The following considerations will illustrate the change over mechanism.

Both of these systems aim to provide a complete premixture of air and gas, usually of the air to gas ratio that gives either the highest temperature or perfect combustion.

The NET Btu per cubic foot of the burning mixture for perfect combustion for manufactured gas is within the range of 86 Btu/ft^3 to 91 Btu/ft^3 for the manufactured gases supplied to a certain territory by the utility company. For natural gases supplied to a certain company at various places, the NET Btu for the burning mixtures varies from 86 to 90 Btu/ft^3. Thus, there is no loss in Btu supplied by the controller unless it happens that a territory receiving the NET 91 Btu/ft^3 product for manufactured gas is changed to natural gas of the NET 86 Btu/ft^3 variety. Then the new gas will require a slightly greater burner head pressure to deliver the same Btu release as formerly.

Since the gas and air come into the proportionating valve of the controller through orifices, changes in the specific gravity of the gas will have some effect on the quantity of each sucked in. An adjustment of the mixture ratio valve cancels this effect.

When a zero governor low pressure inspirator set is changed from manufactured gas with a burning ratio of 4.5 air to one of gas to a natural gas with a burning ratio of nine air to one of gas, some changes will be required, since only one-half the gas will be used as formerly. A more sensitive control valve must be used for the gas. The quantity of air will be the same.

It has been shown that the conversion of ceramic burners from the use of manufactured gas to natural gas and its mixture is a problem requiring:

(1) a detailed knowledge of the performance of the burner on both gases.

(2) an appreciation of the effect of the slower rate of flame propagation and the lower flame temperature of natural gas-air mixtures on the flame characteristics and Btu release.

(3) an appreciation of the fine points of burner construction to make them work on the different gases.

(4) an appreciation of the details of the operation using the burner that effects their successful application to the operation.

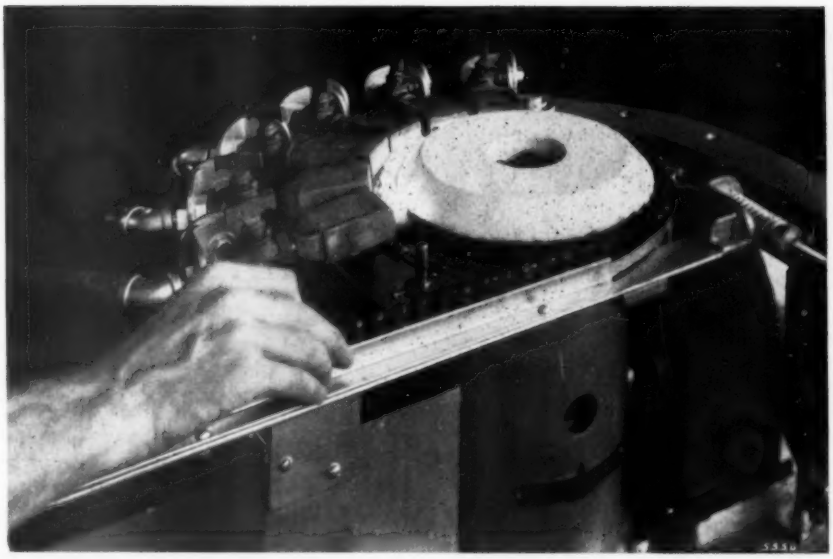


Fig. 8—Hardening airplane push rod balls with superheat burners—Temperature 1525° F. on ball—600 pieces per hour.

Bibliography

Reference #1—"Effect of Radiant Heating on Glass Working Production and Equipment"—Talk given to American Ceramic Society Glass Division—April 25, 1949—H. K. Richardson. Published in *American Ceramic Society Bulletin*, January 1950.

The application of ceramic cup radiant burners to open annealing of glass, small furnaces and high production lehrs is discussed.

Reference #2—"Induction Heating in Relation to Industrial Gas Heating." A report by Battelle Memorial Institute, March 1948, to Committee on Industrial and Commercial Gas Research. Project No. IGR-58—American Gas Association.

On pages 17-30 of the above report a very interesting comparison is made between gas heating with ceramic burners and induction heating. The field of high speed heating is well covered.

Reference #3—"Gas Combustion Equipment"—D. A. Campbell, *Steel*, Sept. 22, 1947.

This is a discussion of the merits of the six systems used to supply the gas-air mixture to burners. Systems V and VI of the reference article are those noted in this discussion.

FPC Starts Hearings on Case Of Phillips in March

The Federal Power Commission has scheduled a hearing on March 20 in Bartlesville, Okla., in the jurisdictional and rate investigation proceeding involving Phillips Petroleum Co. The proceeding was instituted by FPC in October 1948.

The hearing will be held to determine "all relevant facts and circumstances" surrounding Phillips' natural gas operations to enable the FPC to decide whether (1) the company is a "natural-gas company" within the meaning of the Natural Gas Act, and (2) whether any of the company's rates, charges, or classifications are "unjust, unreasonable, unduly discriminatory, or preferential" in connection with any transportation or sale of natural gas subject to commission jurisdiction, including sales to Michigan-Wisconsin Pipe Line Co.

Competitive Bidding Plan of FPC Raises Serious Financing Questions

by John F. Falvey

John F. Falvey

INEFFECTIVE opposition, expressed chiefly by gas industry associations, was voiced at recent House Interstate Commerce subcommittee hearings on a bill designed to give the Federal Power Commission jurisdiction over interstate gas pipe line securities similar to authority now vested in the Securities and Exchange Commission.

Industry observers express the belief that the bill eventually will receive Congressional approval.

Viewed from any angle, the authority sought will mean gas company management disadvantages outweighing the advantages.

While competitive bidding for new securities might permit interest cost slightly lower than could be obtained on the negotiated sale, any benefits stemming from competitive sale presumably would be limited to already well-established companies in the industry.

For a projected new pipe line, competitive bidding would raise a serious question as to whether a bond issue could be sold in pieces at a rate comparable to the forward commitment obtainable at present from insurance companies. In the latter instances, the interest rate is guaranteed and the pipe line can draw down its money as needed over the length of the construction.

Equally as serious, many unforeseen problems arise during construction which require changes in indenture provisions securing the issue. An indenture change following public sale of an issue at competitive bidding might prove to be a monumental task. In a negotiated sale to a limited number of institutions, the job is a simple one.

Competitive bidding also would complicate the problem of new pipe lines satisfying the triangular FPC requirement for a certificate of convenience and necessity of proving that they have sufficient gas, that they have the markets and that they have the ability to finance. Under present competitive bidding requirements of SEC, which function the FPC would assume, discussion with a prospective issuer of securities estops an investment firm from participating in the bidding, and limits it solely to a financial consultation fee.

Meeting the third of the FPC requirements would put a new pipe line in the position of a dog chasing its tail, since

(Continued on page 32)

Pension Funds Offer New Source of Money

INCREASED demand for utility company equities may be expected to result from sharp expansion now taking place in industrial company pensions.

Nothing like a run-away market for corporate equities is expected to result from this development, but the stimulating effect should be noticeable.

Two recent studies give a possible clue as to what is likely to develop along this line.

In one of the most conservative appraisals made to date, Bankers Trust Co. of New York estimates that a minimum of $500 million annually should be added to pension funds through concessions recently won, and likely to be gained, by industrial employees.

Applying to these funds the general policy just announced by Old Colony Trust Co. (affiliate of First National Bank of Boston) of investing in common stocks "of proved merit and future potentialities" about 30 per cent of pension trust funds where full discretion is afforded the pension fund trustee, would mean at least $150 million annually of new money seeking investment in equities.

In its recently published booklet titled "Should Common Stocks Be Used in A Pension Fund?", Old Colony Trust states that an investment organization which includes common stocks should show, over a period of years, a better combined income and principal performance than can be obtained through an investment program restricted to fixed-income obligations. It adds that market fluctuation of common stocks "presents no difficulty in a well-balanced pension fund which includes both stocks and also bonds of short and longer terms."

In the study published by Bankers Trust under the heading of "The Impact of Industrial Pensions on The Capital Markets," the New York bank points out that the expansion in pension funds may result in greater emphasis being placed on purchases of preferred and common stocks.

This new source of funds for stock investments might not be great when measured by the $5 billion of new corporate securities of all types which were brought to market in 1949, but the amount assumes much greater proportions when it is considered that best estimates now available are that new capital requirements in 1950 may fall $750 million below the 1949 figure.

Since most of this anticipated decline in new offerings will take place in the industrial category, utility companies may be able to obtain a greater share of available investment dollars than heretofore has been the case.

Index of Yields : Selected Utilities Stocks

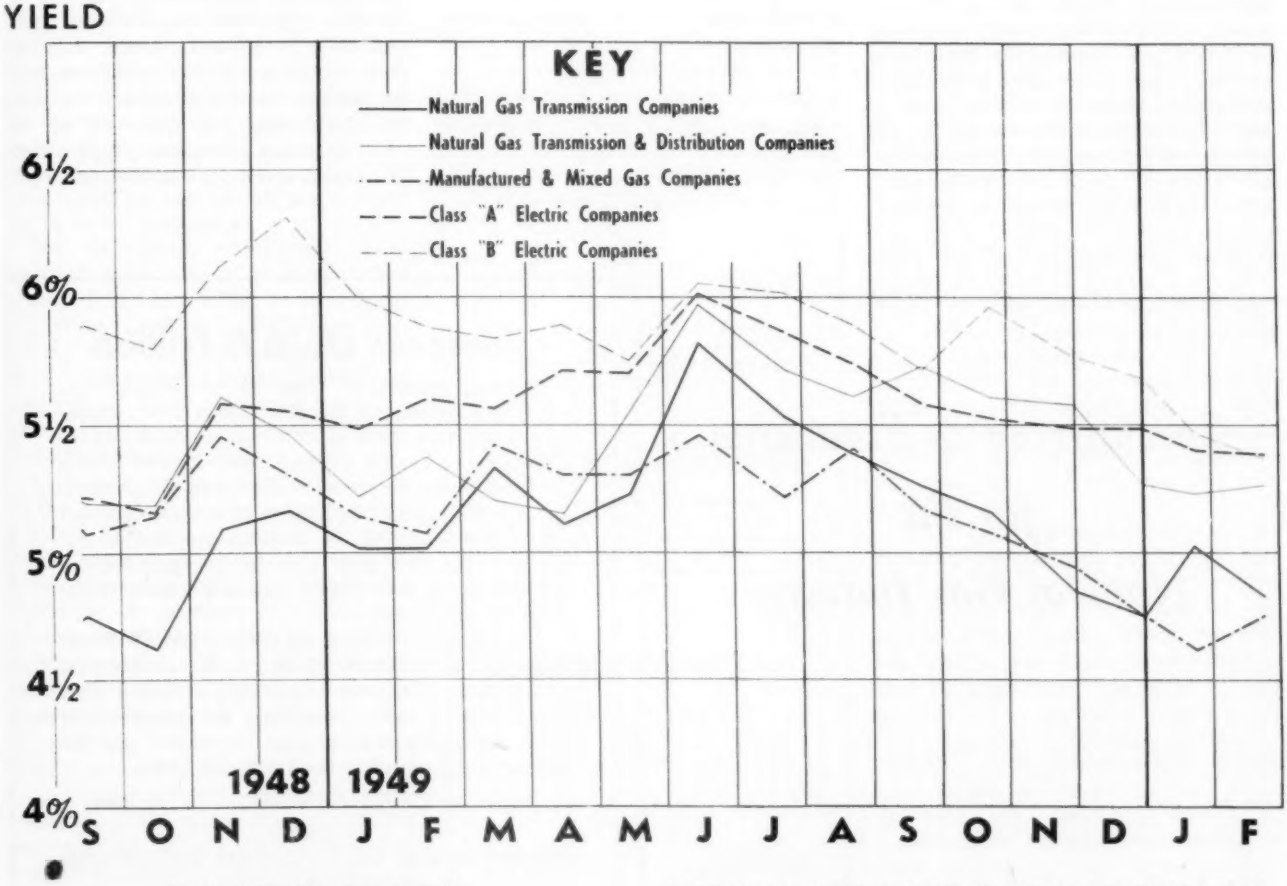
YIELDS obtainable on the stock groups comprising the AMERICAN GAS JOURNAL index turned downward again this month due chiefly to continued heavy investment buying and to the increasing stress placed by individual investors on stocks known for stable income return rather than for capital enhancement possibilities.

The manufactured and mixed gas group of stocks took in stride the 25 per cent increase in dividend payments recently announced by Brooklyn Union Gas Co. permitted by sharp improvement in earnings. At their present yield return basis of 4.75 per cent, this group of stocks appears to be discounting further favorable dividend news expected to stem from still higher earnings, thanks to rate hikes and to greater, and in some instances initial, supplies of life-saving natural gas with its lower costs.

Qualified stock market observers are uniformly cautious in predicting the possible action of common stocks from this point forward, and they support their belief with several pertinent observations. They point out that increasingly speculative buying by individuals is shown in the lower average price for the 10 most active stocks. The economic outlook is muddled by labor difficulties and the market for industrial equities is meeting with rising investor resistance as average prices head toward the high marks reached four years ago.

These various observers differ somewhat in their conclusions and in their general approach. But on one point they seem to be fairly well agreed, that buying of common stocks is becoming more and more closely geared to dividends than to earnings. This was shown in the experience of the market in 1949 when it went higher in line with a 6 per cent increase in dividend payments in the face of a 21 per cent decline in corporate profits. To date in 1950 dividends have been increased by 128 corporations and payments have been reduced by only 14. Lower capital requirements have permitted more liberal industrial management treatment of stockholders last year and to date in 1950, and this same factor is expected to hold true for the balance of the year.

Capital needs of the utility com-



Method of Compiling Index of Yields

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

The companies used in compiling this index are:

Natural Gas Transmission Companies: El Paso Natural Gas Co.; Northern Natural Gas Co.; Panhandle Eastern Pipe Line Co.; Southern Natural Gas Co.; Tennessee Gas Transmission Co.

Natural Gas Transmission and Distribution Companies: Columbia Gas System, Inc.; Consolidated Natural Gas Co.; Lone Star Gas Co.; Oklahoma Natural Gas Co.; Pacific Lighting Corp.

Manufactured and Mixed Gas Companies: Bridgeport Gas Light Co.; Brooklyn Union Gas Co.; United Gas Improvement Co.; Peoples Gas Light & Coke Co.

Class "A" Electric Companies: Boston Edison Co.; Commonwealth Edison Co.; Houston Lighting & Power Co.; Southern California Edison Co., Ltd.

Class "B" Electric Companies: Dayton Power & Light Co.; Hartford Electric Light Co.; Pennsylvania Power & Light Co.; Public Service Co. of Colorado; San Diego Gas & Electric Co.

panies—both electric and gas—will stay high for at least another year. The press of investment buying has forced yields of prime bonds to less than 2.60 per cent, high grade preferred stocks to near 3.80 per cent and better grade common stocks to about 5.20 per cent.

No downturn in investment purchases of common stocks is indicated as yet; and with industrial security offerings now tapering off somewhat and pension fund buying promising to expand sharply as additional thousands of employees win concessions along this line, further paring of yields seems to be in the offing.

While investor preference has swung from good earnings companies to those paying liberal dividends, it is the ability to earn—combined with greater capital needs—which dictates dividend policies of management.

Earnings of the gas companies, both natural and manufactured, have been satisfactory to say the least, despite unusually mild weather which prevailed over most of the country during the greater part of 1949. Close control over costs, combined with anything akin to normal weather experience, places the gas industry in a continuing advantageous position to obtain needed additional funds at a favorable market rate.

Competitive Bidding Plan

(Continued from page 30)

ability to finance would constitute one of the requirements for a certificate, while conversely the certificate would be a prerequisite to advantageous financing.

For an investment firm to bid competitively on a security of which it was not certain would place it in a position of buying a pig in a poke.

Another very serious question is whether the pipe lines under competitive bidding would be able to get junior money into the business, on the favorable basis they can at present.

Only through a high ratio (a maximum of 75 per cent in most financing case instances during the past several years) have the pipe lines been able to impart to the common stock sufficient leverage to attract further money.

Investment value of the debt is much greater than the 75 per cent would indicate since the debt holders have an iron-bound security covered by purchase and sales agreements, with a maximum 20-year payout which in most cases means retirement of the issue on an average over an approximate 12-year span.

This safeguards not only the debt but the equity as well.

In testimony supporting the FPC application for authority over gas line issues, Nelson Lee Smith, FPC chairman, pointed out that applications before the commission at January 1, 1950, totaled more than $900 million. Large as this amount is, all indications point to the probability that the bulk of new pipe line financing already has been done.

Expenditures of $800 million in 1949 for natural gas construction, including distribution facilities, brought the post-war outlays on this score to $2,275 million.

Estimated expenditures for 1950 are set at around $750 million, with the figure tapering off to $475 million in 1951 and to $300 million in 1952.

While the figures for 1951 and 1952 are extremely tentative and possibly very greatly understated, the time likely to lapse before additional FPC authority is granted should combine with the three months' breathing spell for gas pipe lines after the bill is signed to suggest that practically all of the 1950 financing will be completed before any effects from the new legislation are felt.

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Reserves Up 6.5 Trillion

Proved recoverable reserves of natural gas showed a substantial increase during 1949, reaching an all time high of 180,381,344 MM cu. ft., according to a study released under date of March 14 by a joint committee of American Gas Association and American Petroleum Institute that makes an annual study of the nation's gas and oil reserves. This new total represents a gain of 6.5 trillion cu. ft. over 1948's year-end total of 173,869,340 MM cu. ft.

Production of natural gas for the year 1949 was estimated at 6,245,041 MM cu. ft., an increase of 237 billion feet over that of the preceeding year. The following table summarizes the report of the joint committee with respect to natural gas reserves and production for 1948 and 1949:

Dec. 31, '48	Dec. 31, '49	Increase
RESERVES		
173,869,340 MM	180,381,344 MM	6,512,004 MM
PRODUCTION		
6,007,628 MM	6,245,041 MM	237,413 MM

Gas production figures are net after deducting gas returned to reservoirs for cycling and pressure maintenance. The totals include gas put into underground storage.

N. C. McGowen, President of United Gas Corp., served as chairman of the AGA committee on natural gas reserves.

More Decisions on Explosion Liability Reviewed and Examined

By Leo T. Parker
Attorney at Law, Cincinnati

CONSIDERABLE discussion has arisen from time to time over the legal question: How can a gas company avoid liability for injuries to persons and damage to real property caused by explosion of gas? According to a recent higher court, if a gas company employs an independent contractor to do a job, as installing gas burning equipment, the company is not liable if, through negligence of the contractor, an explosion occurs. In other words, the independent contractor is solely liable, thereby relieving the employer from liability. This general rule of law is applicable to all employers.

For illustration, in Allison v. Ideal Laundry & Cleaners, 55 S. E. (2d) 281, reported October 1949, it was shown that Ideal Laundry and Cleaners converted their coal fired boilers to gas fired. This work of conversion was accomplished by a contractor who was paid a flat contract price for the job. Soon afterward the officials of the laundry company testified that the use of gas in firing the boilers was somewhat more efficient than the use of coal and obviously resulted in an almost complete elimination of smoke and soot. Not long afterward an employe of the laundry discovered that gas was escaping because he heard a hissing sound. A few moments thereafter the escaped gas was ignited through some unknown means. Considerable damage was done to nearby private property.

This legal question was presented the court: Since the escaping gas was caused by negligence of the contractor who performed the work of converting the laundry from coal to gas, who was liable for resultant damages?

The higher court refused to hold the laundry company liable, and said:

"In view of the considerations which have been stated, the laundry, the employer, cannot be justly subjected to liability for the independent contractor's negligence."

Recently a higher court laid down important law, as follows: A manufacturer who fails to exercise reasonable care in the manufacture of a gas storage tank is subject to liability for harm and damage resulting from its use. This broad law is applicable although a purchaser makes the installation. However, where the manufacturer acts as an independent contractor and installs the equipment or gas storage tank, it is solely responsible for resultant injuries and damages caused by defective materials and also improper installation.

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. . . we're happy that you suffered no interruption in your gas service—and that you were able to enjoy low-cost gas for cooking, water heating or house heating without any problems of fuel supply.
TO ALL OUR CUSTOMERS
. . . thanks to new and expanded facilities, no public request for conservation of gas was needed during the unprecedented cold spell.
☆
PORTLAND GAS & COKE COMPANY

After successfully meeting record-breaking demands for gas during a record-breaking cold spell, Portland (Ore.) Gas & Coke company ran this advertisement. With temperatures sagging to 3 below, coldest since 1888, gas send-out on five consecutive days was greater than the previous winter's coldest day by as much as 14 per cent.

Improper Stove

It is well established law that officials of a gas company which sells gas equipment must be very careful not to recommend the equipment for use under conditions not recommended by the manufacturer. Failure to follow this rule of law will render the gas company liable.

For example, in Dalrymple v. Sinkoe, 53 S. E. (2d) 437, reported July 1949, the testimony showed facts, as follows: The operator named Dalrymple of a gasoline filling station sued for injuries sustained in an explosion of gas from a water heater. The testimony showed that Dalrymple sat down in the shower room to smoke a cigarette, and when he struck a match to light the cigarette, there was a terrific explosion. He was seriously and permanently injured.

After Dalrymple returned from the hospital, his attention was called to a label on the water heater. The label was located near the bottom of the heater, giving model, serial number, etc., and it was stated thereon that it was "equipped for use with MFRD gas," and also contained in very small lettering the following statement: "Warning: This heater is not to be used with bottled gas, butane or other liquified petroleum gases."

Dalrymple testified that the seller knew that he intended to burn liquid gas in the heater, and further the seller recommended it for this use. Although the lower court refused to hold the seller liable, the higher court reversed the verdict, and said:

"If a seller, not knowing or caring whether his representations are true or false, goes so far as to represent that article sold is safe for a certain use, while it is imminently dangerous when

(Continued on page 42)

News of the Gas Industry

Geo. Whitwell Is Chosen Chairman AGA Convention Committee

George E. Whitwell, vice-president, Philadelphia Electric Co., has been appointed chairman of the American Gas Association 1950 General Convention Committee, it was announced by Hugh H. Cuthrell, vice-president, The Brooklyn Union Gas Co., and President, AGA.

Other members of the committee which will be responsible for the thirty-second annual convention to be held at Atlantic City Oct. 2-6, are: Frank H. Adams, President, Surface Combustion Corp., Toledo; L. L. Baxter, President, Arkansas Western Gas Co., Fayetteville, Ark.; R. R. Blackburn, vice-president and secretary, Southern California Gas Co., Los Angeles; Henry Fink, President, Michigan Consolidated Gas Co., Detroit; A. J. Gonnoud, President, Kings County Lighting Co., Brooklyn; Dorr P. Hartson, vice-president and general manager, Equitable Gas Co., Pittsburgh; L. E. Knowlton, executive vice-president, Providence Gas Co.; Lovett C. Peters, vice-president, The Laclede Gas Light Co., St. Louis; Earl Smith, President, South Jersey Gas Co., Atlantic City; and Kurwin R. Boyes, secretary, AGA convention manager.

Todd Retires; Had Long Career In California

S. W. Todd, superintendent of operations, Pacific Lighting Corp., Los Angeles, terminated many years of service in the gas industry when he went into retirement Feb. 1 under the company's uniform pension plan.

Mr. Todd's career in the industry began in Santa Ana in 1910 when he joined the gas department of the Edison company. With the sale of the Edison gas properties to the newly organized Southern Counties Gas Co. in 1911, he elected to continue with the latter organization, becoming the district manager of Orange County.

A pioneer in the natural gas business in Southern California, he had charge of the construction of one of the earliest pipe lines, when Southern Counties laid its first line in 1914, bringing a supply of gas from the Olinda field into Anaheim.

Shifts at Portland Gas & Coke Involve Three Executives

C. V. Griffith

C. W. Platt

H. N. Burnside

Directors of Portland, Ore., Gas & Coke Co. on Jan. 11 accepted the resignation of C. W. Platt as secretary and treasurer and elected C. V. Griffith treasurer and assistant secretary, and H. N. Burnside secretary and assistant treasurer.

Mr. Platt has been identified with the company since 1910. He was elected assistant secretary and assistant treasurer in 1912 and secretary, treasurer and a director in 1924. He will continue as a director and also will continue to serve Lewis and Clark College as a trustee and secretary of the board of trustees.

The directors commended Mr. Platt for "his long record of devotion to the company's interests; for his recognized preeminence in the field of public utility accounting; for his efficient administration of both the important offices held by him; for his earnestness, sincerity and understanding in representing the company before the public, including the regulatory authorities; and for the valuable contribution he has been making for many years to Lewis and Clark College and other causes of vital interest to our community."

He is a past chairman of the accounting section of the Pacific Coast Gas Association.

Mr. Griffith is a 24-year veteran, having joined the company as an accountant after graduating from Washington State College. He was named chief accountant in 1943 and was elected assistant treasurer in 1948. He is a past President of Portland chapter, National Association of Cost Accountants.

Mr. Burnside, also a 24-year veteran, was assistant to the secretary and treasurer from 1936 until 1948 when he was elected assistant secretary. He is a graduate of Northwestern College of Law and a member of the Multnomah Bar Association.

Operating Section Will Hold Conference in April

The American Gas Association Operating Section will hold its annual distribution, motor vehicles and corrosion conference at the Hotel Book-Cadillac, Detroit, April 3-5. Safety and accident prevention are listed among the subjects of discussion.

E. G. Campbell, The Peoples Gas Light & Coke Co., Chicago, is chairman of the AGA Operating Section which was responsible for the overall program. He has been assisted in the assembling of topical and requested subjects by F. J. Hall, Michigan Consolidated Gas Co., chairman of the distribution committee; J. L. Coyne, Rochester Gas & Electric Corp., chairman, motor vehicles committee; and Sidney E. Trouard, New Orleans Public Service, Inc., chairman, corrosion committee.

General sessions will be held each morning and parallel luncheon conferences will be staged on Monday and Tuesday, April 3 and 4, respectively. Speakers from within and outside of the gas industry have been scheduled for the general sessions and their range of subjects include such topics as galvanic corrosion, engine maintenance, meter performance, employee relations, introduction of natural gas in manufactured gas areas and other matters of importance to operating men. A group of industrial films will be shown on Wednesday.

Corrosion and distribution conferences will include problems in the manufactured, mixed and natural gas fields. The motor vehicles conference and discussions will represent a joint venture by AGA and Edison Electric Institute.

Sims and Bowen Head Brooklyn Union Purchasing Dept.

John C. Sims has been appointed purchasing agent of The Brooklyn Union Gas Co., and S. Lipton Bowen has been made assistant purchasing agent.

Mr. Sims started with Brooklyn Union in 1935 as a fitter's helper, subsequently taking cadet training. For the past two years he has been assistant purchasing agent.

Mr. Bowen joined the company in 1939 as a new business department clerk. In October 1949 he became administrative assistant in the purchasing department.

Miss Stelzl Heads Seattle's New Home Service Department

Anne Stelzl

A new home service department was opened January 30 by the Seattle Gas Co. at its downtown offices, according to N. Henry Gellert, President. The department will be directed by Miss Anne Stelzl, using the gas company's professional name of June Holladay

The department will be well-equipped to assist all home makers in the general use of gas appliances. A complete, modern gas kitchen has been installed for demonstrations of equipment, and for cooking and baking schools. The company's big auditorium, seating more than 200 persons, will be used for the department's activities.

Miss Stelzl also plans to make frequent home calls on gas users, and to speak before women's clubs and school home economics classes. She will work closely with other Seattle home economists and conduct home economics classes from time to time.

Miss Stelzl is a home economics graduate of Pratt Institute of New York, and was with the Brooklyn Union Gas Co., the consumer service department of General Foods Corp., and Standard Brands, Inc.

Titrilog Described in Booklet Of Consolidated Engineering

Consolidated Engineering Corp., Pasadena, Calif., has just released a four-page bulletin on the new Consolidated titrilog, an apparatus for the continuous recording of trace quantities of sulphur compounds. The measurement and control of sulphur content of natural gas is one of the important applications discussed. Other uses, based on monitoring oxidizable sulphur compounds in other gases or mixtures of gases, are mentioned. Specifications and rental service information are given.

Frank R. Baker

James E. Allison

Baker and Allison Get New Posts With Texas Gas Transmission

Texas Gas Transmission Corp. has announced the promotion of James E. Allison to the position of assistant superintendent of pipe lines for divisions one and two of the company's system. At the same time Texas Gas named Frank R. Baker as supervisor of advalorem taxes for the company. Both Mr. Allison and Mr. Baker will have their headquarters in Owensboro, Kentucky.

Mr. Allison joined Texas Gas in 1948 as a construction engineer for the company's new 26-inch pipe line from Texas to Ohio. Prior to this he was pipe line superintendent for Modern Welding Co.

Mr. Baker joins Texas Gas after several years with two major natural gas pipe line companies as tax agent and adjuster. In his new position he will have charge of all tax matters for the company in state, county, school district and other local taxing groups throughout the 2400 mile pipe line system.

New Officers Elected by Ass'n Promoting Warm Air Heat

New officers of the National Warm Air Heating and Air Conditioning Association are Clarence S. Franke, President; Will D. Redrup, first vice-president, and C. B. Phillips, second vice-president. They were elected at the association's annual convention in Cleveland in December.

Mr. Franke is President of the American Furnace Co., St. Louis.

Mr. Redrup is chairman of the board of The Majestic Co., Huntington, Ind.

Mr. Phillips is vice-president in charge of sales for Surface Combustion Corp., Toledo. He has served as a member of the board of trustees of the Association for the past three years.

The association indicated that it was investing more than $134,000 this year in research, trade education and consumer publicity for the promotion of warm air heating.

Data on Safety Equipment

The 1950 issue of "Everything in Safety," a catalog of personal protective equipment and industrial safety devices, has been released by the General Scientific Equipment Co., 2700 W. Huntingdon Street, Philadelphia 32.

Enander Retires from Public Service of Northern Ill.

After nearly 45 years service in the gas utility business, E. H. Enander has announced his retirement from the Public Service Co. of Northern Illinois.

A graduate of Armour Institute of Technology in 1906, Mr. Enander began his utility career with the Northwestern Gas Light and Coke Co. which later became part of Public Service Co.

He became superintendent of gas operations in 1936 with headquarters in Oak Park, Ill., and at the time of his retirement was assistant to vice-president. In this capacity he was in charge of the company's gas research and development program.

Among his contributions to the growth and development of the gas business was the planning and supervision of the utility's first gas conversion program which was carried out in 1931 when gas appliances of nearly 150,000 customers were adjusted to burn mixed gas instead of manufactured gas. Another and more recent contribution pertains to the research, development and construction of the company's high pressure underground gas storage system which facilitated the changeover of the utility's system to straight natural gas operation and helped make possible the addition of several thousand new residential space heating customers the past three years despite the continued shortage of pipe line capacity.

Valve Manufacturers Ass'n Re-elects Its Officers

The Valve Manufacturers Association, a national organization, held its annual meeting on Feb. 16 in New York City, and W. B. Holton, Jr., President of Walworth Co., New York City, was re-elected President.

Ernest Cochran, vice-president, Chapman Valve Manufacturing Co., Indian Orchard, Mass., and Charles W. Burrage, secretary of The Lunkenheimer Co., Cincinnati, were re-elected vice-presidents. Mr. Wayne Young, President of The Ohio Injector Co., Wadsworth, Ohio, was elected a vice-president. George A. Cooper, of New Rochelle, N. Y. was re-elected secretary-treasurer.

A spokesman for the association stated that the 1949 dollar shipments of valves and pipe fittings were under those of 1948 by approximately 27 per cent based on statistics reported by members and others, and compiled in the Association offices.

Blaw-Knox Forms Synthetic Fuels & Chemicals Dept.

Chemical Plants Division of Blaw-Knox Co., Pittsburgh, Pa., has announced the formation of a synthetic fuels and chemicals department.

L. W. Alberts has been appointed manager of the department, and Donald W. Beery has been made senior engineer.

Norton Keys to Long Generator Life:

Crystolon key brick for door arch

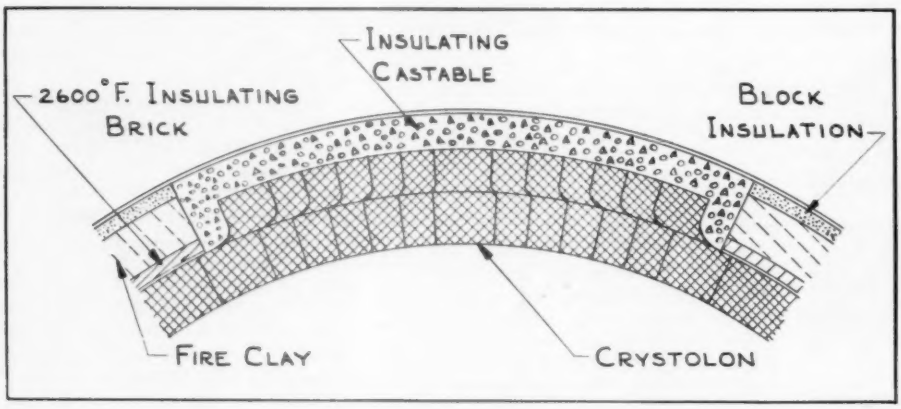
1. CRYSTOLON* Shapes

Crystolon shapes are made of the highest quality Norton silicon carbide plus a minimum of refractory bond. They are true to size and shape. Crystolon shapes possess high refractoriness and great strength at elevated temperatures and they have a remarkable resistance to abrasion, to spalling and to both the chemical and physical action of molten slag. Slag may adhere to the surface to a very limited degree but what does stick is very easily removed without harming the surface of the shape.

*Trade-mark Reg. U. S. Pat. Off.

2. Correct Design of Door Arch

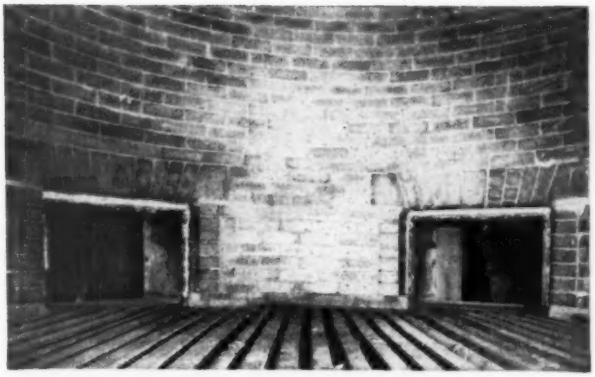
Norton doors have a record of long life and trouble-free service due to an original design which has proved its serviceability in all Norton installations over a period of more than 16 years. The special Norton door arch shapes are radial in two directions to provide maximum wedging or keying. Furthermore, they are cut away (see illustration above) at the rear to reduce heat transfer to the shell. Due to the rugged design of Crystolon shapes, door arches properly installed usually last 6000 to 8000 hours.



Cross-section drawing of Crystolon door arch shapes and insulating materials

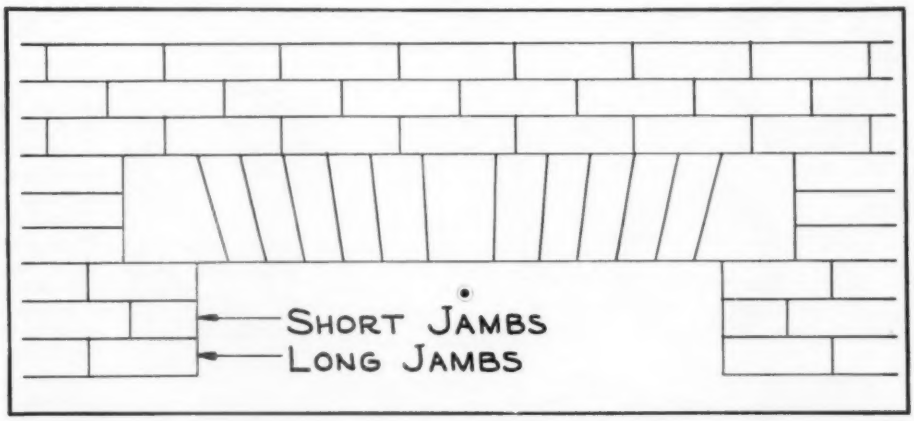
NORTON Norton Company • Worcester 6, Mass.

3. Installation Know-How



Typical Norton generator lining

The experience of Norton refractories engineers in directing the installation of hundreds of gas generator linings around the country has developed a fund of important knowledge about the proper design and installation of Crystolon linings. For example, door arches should be set in place dry with the key brick raised about 1½". The skew brick must be level both vertically and horizontally to insure proper fitting of the arch shapes. The brick work between the doors should next be cemented in place, then the special arch shapes are removed, cemented and replaced, still leaving the key brick to be driven in place.



Drawing showing face of Norton Crystolon shapes with thirteen arch shapes in position

Free Booklet

Many helpful hints (like that on proper door treatment given above) may be found in a booklet just prepared by Norton refractories engineers and which we will be glad to send you at no obligation. Write for our booklet "Relining and Repairing Gas Generators" to Refractories Division, Norton Company, Worcester 6, Mass.

Can't be beat for handling heat!

NORTON®
REFRACTORIES

Gilmore Named Chief Engineer, Macnick Div. of Rockwell

E. R. Gilmore

L. A. Dixon, vice-president of Rockwell Manufacturing Co., Pittsburgh, has announced the appointment of E. R. Gilmore as chief engineer of the company's Macnick Division in Tulsa, Okla. This division manufactures fluid measurement instruments, chart clocks, etc.

Mr. Gilmore has had experience in research and development of equipment for the measurement and control of fluids. After graduating from Rensselaer Polytechnic Institute in 1920 he joined Cities Service Co. in Bartlesville, Okla., as a junior engineer.

In 1936 Mr. Gilmore joined the Pittsburgh Equitable Meter Division of Rockwell as a project engineer. Subsequently he was plant engineer then chief engineer.

Rockwell has had an extensive field research program under way for some time, and during the past year Mr Gilmore has been the director of this activity. This was a planned procedure to permit him to gather the latest data and statistical information on performance of equipment to be manufactured by Macnick.

He is a registered professional engineer in Pennsylvania and has been active on several committees of the AGA.

Panhandle Eastern Wants To Expand Capacity

Panhandle Eastern Pipe Line Co., of Kansas City, has applied to the Federal Power Commission for authorization to expand its pipe line system capacity to enable it to transport 250,000,000 cu. ft. of natural gas per day which would be purchased from Trunkline Gas Supply Co.

Trunkline last November asked the FPC to authorize a 740-mile Louisiana-to-Illinois pipe line designed to carry the gas for delivery to Panhandle.

The proposed Panhandle project is estimated to cost $14,689,500. The new facilities, to be located in Illinois, Indiana and Michigan, would include 170 miles of pipe line and installation of 16,000 horsepower in compressor units at existing stations. Panhandle said the new facilities, when completed and in operation in connection with its other facilities, would increase the system peak day design capacity to 800,000,000 cu. ft.

E. B. Blease Joins H. Zinder

H. Zinder and Associates have announced the association with them of Ernest B. Blease, formerly supervising accountant with the Federal Power Commission.

FPC Plans Rule to Impose Competitive Bidding

The Federal Power Commission has issued a notice of proposed rule making which would amend its General Rules and Regulations to impose competitive bidding requirements on issuances of securities subject to FPC jurisdiction under the Federal Power Act.

The proposed amendments would require, with certain exceptions, that the applicant publicly invite sealed bids at least six days prior to entering into any contract or agreement for the security issue. After opening the bids, the applicant would be required to file an amendment with the FPC describing what it has done to comply with the competitive bidding requirement, summarizing the terms of the bids received, and stating the action it proposes to take. The provisions of the rule contemplate prompt Commission action on telephone and telegraphic communications to the Commission of the contents of the amendment.

E. A. Flaschar Made President Of Stacey Bros. Gas Const.

Eric A. Flaschar

Election of Eric A. Flaschar as President of The Stacey Bros. Gas Construction Co., Cincinnati, to succeed William E. Gruening, was announced Feb. 7 by J. B. O'Connor, board chairman of Stacey Bros. and executive vice-president of Dresser Industries Inc., of which Stacey Bros. is a subsidiary.

Arthur E. Harvey, who joined Stacey Bros. in 1938, was advanced from vice-president to executive vice-president, and Herbert C. Brinkman, who has been with the company since 1926, and its chief engineer for the past 10 years, was elected vice-president.

Mr. Flaschar has been general manager of the Stacey-Dresser Engineering Division of Stacey Bros., which is currently in the process of being moved from Cleveland to Cincinnati, where its operations will be coordinated with those of the parent company.

Born in Austria, he completed his technical education in Austrian and German universities, before coming to the United States following World War I.

His first work here was with the Standard Oil Co. of California, where he advanced to the position of chief design engineer before going to the M. W. Kellogg Co.

Sent abroad for six months in 1945 on a special mission for the War Department, he returned to associate himself with Dresser Industries.

H. L. Hurley Given New Duties By Rockwell at Houston

H. L. Hurley

C. K. Madison, Houston district manager for Rockwell Manufacturing Co., Pittsburgh, has announced that H. L. Hurley will handle all major oil and engineering company accounts in the Houston district replacing J. W. Northcutt, who was recently appointed Atlanta district sales manager.

Mr. Hurley has been with the company since 1943 as sales and service representative for valves and gas equipment in Southwest Texas.

Mid-West Personnel Meeting Held at Kansas City

Changes in the Federal Wage and Hour Law and in employee welfare plans were major topics of discussion at the Midwest Personnel Conference of the American Gas Association, held at Kansas City, Mo., on Feb. 2.

H. H. Duff, personnel director, Panhandle Eastern Pipe Line Co., Kansas City, presided at the morning session which comprised a panel discussion on Federal Wage and Hour Law changes. The Wage and Hour Public Contracts Division of the Department of Labor recently issued a booklet, "Explanatory Bulletin Regulations Part 541," on this subject and the panel labeled this publication a valuable aid. The Conference advises every company, in the light of the new regulations, to re-examine all employees formerly considered exempt from the provisions of the Federal Wage and Hour Law.

The afternoon session was devoted to a discussion of recent changes in employees' welfare plans. Roy L. Thomas, asst. sec., Colorado Interstate Gas Co., and chairman, AGA Midwest Personnel Conference, led a discussion on the problem of selling the advantages of the American way of life and form of government to the citizens of local communities. Eleven companies were represented at the meeting which was arranged by Mr. Thomas, assisted by vice-chairman Joe T. Innis, Northern Natural Gas Co., Omaha, and George C. Pardee, Metropolitan Utilities District, Omaha.

Laclede Gas Light Changes Name, Dropping 'Light'

Stockholders of The Laclede Gas Light Co. on Feb. 14 voted to change the company name to Laclede Gas Co.

The stockholders also authorized the issuance of 480,000 shares of cumulative preferred stock, par value of $25.

Executive Change Announced By Superior Meter

G. Powers

Superior Meter Co., Inc., Brooklyn, N. Y., announces the election of G. Powers to the office of chairman of the board, in addition to his present position as President of the company. He succeeds John H. Walsh who founded Superior Meter 40 years ago and was its President until 1947. During the war Major Powers headed the office of inspector general of the Air Force in the midwest. As an officer of Perfection Meter Co. he was instrumental in working out the merger with Superior Meter Co.

Industry to Be Represented At Chicago Centennial

A committee of five past Presidents of the American Gas Association has been appointed by Hugh H. Cuthrell, President of AGA, to represent the gas industry at the dedication of a gas industry exhibit to be presented to the Chicago Museum of Science and Industry by The Peoples Gas Light and Coke Co., in celebration of the 100th anniversary of the Chicago gas utility. The former AGA presidents who will attend the dedication of the exhibit in Sept. 1950, are: E. J. Boothby, President, Washington Gas Light Co.; R. H. Hargrove, President, Texas Eastern Transmission Corp., Shreveport, La.; Robert W. Hendee, President, Colorado Interstate Gas Co., Colorado Springs, Colo.; Hudson W. Reed, President, The Philadelphia Gas Works Co.; and J French Robinson, President, The East Ohio Gas Co., Cleveland.

HISTORICAL EXHIBIT

The gas industry exhibit, through use of colorful visual displays, will recount some of the early history of gas, and utilize modern display methods to depict modern production and utilization of gas as a fuel. Because of the importance of this exhibit and its contribution to the historical record of the gas industry a resolution was adopted at the 1949 AGA convention—"that a special committee of five distinguished leaders in the American gas industry, who are not residents of Chicago, be appointed by the President to represent the AGA at the dedication of the exhibit."

The executive board of the Association approved the recommendation at its last meeting and each of the five past Presidents named above has accepted Mr. Cuthrell's invitation to serve on this committee.

American Gas Industry Host To German Gas Experts

American gas industry was host last month to four German gas production experts as a part of a Marshall Plan study under the auspices of the Economic Cooperation Administration. The visiting experts were Dr. Heinrich Kaun, director of public utilities, and Dr. Ernst Schenk, general manager, gas division, City of Stuttgart; and Dr. Alfred Mette, director of public utilities, and Dr. Ernst Michel, general manager, gas division, City of Hamburg. They made a six weeks' tour covering an itinerary planned by ECA. The AGA assisted in planning the itinerary and arranged the contacts for the German scientists in the cities they visited.

The German gas experts were studying modern American developments in the production and distribution of manufactured gas with specific interest in the operation of gas works, operation of coal crushing and mixing plants, piping network, long distance transmission, and perfecting of gas appliances.

They visited Consolidated Edison Co., The Brooklyn Union Gas Co., and Semet-Solvay Co. in New York City, and Koppers Co. in Kearney, N. J. Other cities in the itinerary included Cambridge and Springfield, Mass.; Cleveland, Chicago, Louisiana, East St. Louis, Mo., Birmingham, Pittsburgh and Washington, D. C.

VULCAN DIAPHRAGMS EXCEL IN UNIFORMITY

Maximum uniformity of shape and thickness is one of the many advantages of VULCAN diaphragms. They are extremely flexible, yet they need no oiling—which means a cleaner shop and a saving of time and effort.

VULCAN Diaphragms practically abolish tie leaks, for they are securely fastened to the rings by VULCANIZING plus special wire, and are machine-tested for tightness.

Specify VULCAN Diaphragms, for more accurate metering and a cut in maintenance costs.

Vulcan PROOFING COMPANY

FIRST AVENUE & 58th STREET • BROOKLYN 20, NEW YORK

Southern Gas Ass'n Announces Convention Program

L. L. Baxter

Ways to improve relations with employees will form an important topic for the Southern Gas Association's forty-second annual convention March 27-29 at Galveston.

A featured speaker at the convention's general sessions will be Merlyn S. Pitzele, labor editor of the magazine *Business Week*. Two sectional meetings on employee relations —an innovation in SGA—will hear personnel problems discussed by Dr. George S. Benson, of Harding College, Searcy, Ark., and Dr. Robert K. Burns, of the University of Chicago.

The convention is expected to draw 1,200 delegates from thirteen southern and southwestern states. Headquarters will be Galveston's waterfront Buccaneer and Galvez Hotels, and sessions also will be held on the Municipal Pier.

Sectional meetings will be held morning and afternoon on Monday the 27th, and on Tuesday afternoon. General sessions will be held Tuesday and Wednesday mornings, with a general session luncheon Wednesday.

L. L. Baxter, Arkansas Western Gas, Fayetteville, Ark., SGA President, and R. R. Suttle, of Dallas, SGA managing director, will present their reports. "Clear the Track Ahead" will be the subject of Hugh H. Cuthrell, American Gas Association President.

W. Paul Jones of Evansville, Ind., President of Servel, will discuss "Old-Fashioned Selling", and a report on university short courses will be given by Dr. Frank H. Dotterweich, of Texas College of Arts and Industries, and Harry N. Carter of University of Tulsa.

Other speakers and their subjects are:

M. V. Cousins, United Gas Pipe Line, Shreveport, on "The Individual on the Job."

Dr. William R. Spriegel, professor of management and associate dean of the college of business administration, University of Texas, on "How Your Personnel Department Can Serve You."

L. M. Tognoni, Director of the Middle South Area Office, New Orleans, on "The Middle South Plan for Attracting New Industries."

P. E. Roll, Carrier Corp., Houston, on "Large Scale Gas Air Conditioning."

Henry C. Hill, Boeing Aircraft, Seattle, on "What's Happening in the Small Gas Turbine Field."

Fred W. Haines, vice-president, Cleaver-Brooks, Milwaukee, on "Package Steam Generators."

W. Z. Davison, Mississippi River Fuel Corp., St. Louis, on "Industrial Sales and Pipe Load Factors."

B. Porter, United Gas Pipe Line, Shreveport, on "A New Development in Drilled Port Pipe Burners."

J. M. Lynn, Jr., Lone Star Gas, Dallas, on "Commercial Gas—the Most Economical Fuel."

Patrick D. Moreland, Texas Restaurant Association, Austin, on "What the Restaurateur Needs from the Gas Companies."

Harvey E. Noss, National Potato Chip Institute, Cleveland, on "The Commercial Food Processing Industry."

H. Vinton Potter, AGA, on "The Background Planning of AGA's National Advertising Program."

L. C. Roberts, Lone Star Gas, Dallas, on "Advertising and Promotion of Dealer Programs."

Carl H. Horne, Alabama Gas, Birmingham, on "Capitalizing on the Old Stove Round-Up, 1949-50."

Dean A. Strickland, United Gas, Houston, on "The Profit Story Means More Dealer Sales."

W. A. Hudson, Chattanooga Gas, "The Highlights of SGA Residential Round Table Conferences."

James B. Reese, Lone Star Gas, Dallas, on "Gas Air Conditioning, Past and Future."

J. J. Sheehan, Southern Union Gas, Galveston, on "Increase Sales by Analyzing Salesmen's Results."

Harriet Pruitt, Lone Star Gas, Dallas, on "Here and There in Home Service."

Harold E. Jalass, Cribben & Sexton, Chicago, "It's Got It."

Harold Massey, GAMA, New York, on "Sell ALL Residential Appliances."

Dr. Frank H. Dotterweich, Texas College of Arts & Industries, "Natural Gas Odorants."

Paul Kayser, El Paso Mutual Gas, on "The Effect of Oil Proration on the Marketing of Flare Gas."

James B. Henderson, Transcontinental Gas Pipe Line, Houston, on "The Effect of Gas Proration on Gas Transmission Operations."

Prof. William Boyd, University of Texas, on "Business Letter-Writing."

P. H. Hutchinson, Atlanta, on "General Accounting for Public Utilities."

Harold F. Taylor, Oklahoma Natural Gas, on "How to Hire Better Clerical Workers."

W. M. Wampler, Chattanooga Gas, on "Depreciation."

Chairman of the general convention committee is J. H. Wimberly, Houston Natural Gas Corp.

STAMANCO

GAS PURIFIERS

STAMANCO Purifier Boxes are designed to your specific operating and service conditions -- thus assuring utmost efficiency and economy. Made in any style or capacity. We design, build, and install STAMANCO Purifier Boxes complete with all trays, piping, valves, gantry cranes, and equipment for the economical handling of oxide materials. Let us figure on your requirements.

The STACEY MANUFACTURING Co.
SINCE 1851
CINCINNATI 16, OHIO

GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES

ENGINEERS • FABRICATORS • CONSTRUCTORS

An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

New England Gas Ass'n Lists Convention Speakers

The 23rd annual meeting of the New England Gas Association will be held March 23 and 24 at the Hotel Statler, Boston.

The following speeches will high-spot the program:

Address of the President, E. H. Eacker, President, Boston Consolidated Gas Co.

Address by the first vice-president of AGA, D. A. Hulcy, President, Lone Star Gas Co., Dallas.

Par-Dollar Research Progress, by E. J. Rutherford, President, Worcester Gas Light Co.

Corporate Accounting and the Public, by Dr. Thomas H. Sanders, Professor of Accounting, Harvard Business School.

Public Relations Phase of Conversion to Natural Gas, by an executive of the Washington Gas Light Co.

New Gas Production Processes, by P. T. Dashiell, consultant, United Engineers and Constructors.

Gas Appliance Market Surveys, by a partner of Booz, Allen & Hamilton, management consultants.

Gas for New Homes—Public and Private, by Roy E. Wright, director of sales, NEGEA Service Corp.

Gas Industry Possibilities, by W. Paul Jones, President, Servel, Inc.

It's Easy to Sell Gas Water Heaters, by R. L. Towne, sales promotion manager, Rheem Manufacturing Co.

Par Promotion in '50, by Frank C. Smith, President, Houston Natural Gas Corp.

Time's a-Wasting, by Thomas M. Joyce, general counsel, Massachusetts Electric and Gas Ass'n.

Natural Gas for New England—Ratewise or Otherwise, by Robert E. Ginna, vice-president, Rochester Gas & Electric Corp.

Gas Company Financing Today, by Harold H. Young, partner, Eastman Dillon.

There will also be an address by Stanley H. Hobson, President of GAMA, and a report on the New England association's year by Clark Belden, executive secretary.

Texas-to-California Delivery Hits New Peak

A new high of 325 million cu. ft. in daily deliveries of Texas gas to Southern California and Southern Counties Gas companies was registered in February, according to reports from Glen Vail, superintendent of the companies' Blythe compressor station.

Deliveries of "out-of-state" gas to the Los Angeles utilities, which has been steadily increasing since the completion of the Texas line in 1947, makes possible the conservation and storage of California gas in underground reservoirs at Goleta and Playa Del Rey for use during periods of maximum demand.

Consolidated Natural Gas Offers Scholarships

Three four-year scholarships in chemical engineering at Illinois Institute of Technology will be offered by the Consolidated Natural Gas Systems Educational Foundation, Cleveland, Ohio.

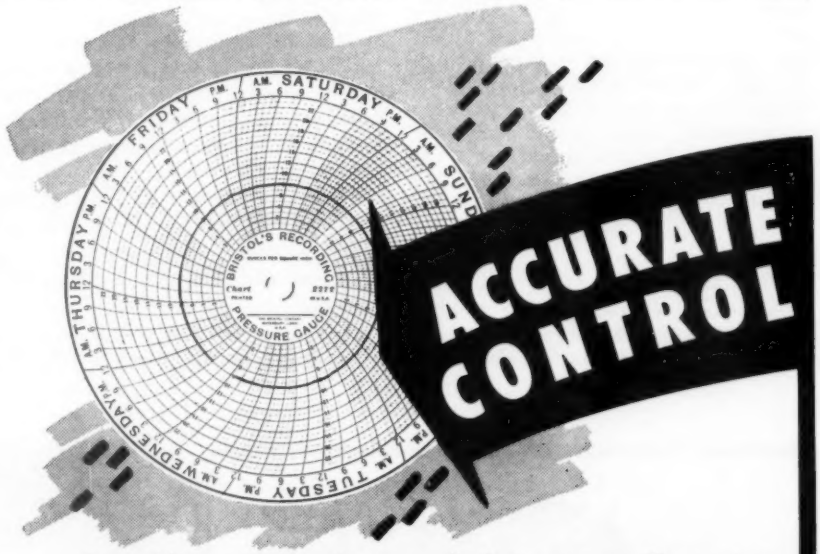
The scholarships, beginning in September 1950, emphasize gas engineering and technology in the fourth year, with special courses at the Institute of Gas Technology on the Illinois Tech campus. The scholarships include full tuition, fees, and books.

Winners will be determined by high school records, extracurricular activities, and scholarship demonstrated in a written examination. Applications must be sent to the director of admissions of Illinois Tech by May 13.

The scholarships are being offered by the natural gas companies group to advance education and research in industry problems. High schools students graduating by June 1950 are eligible.

GAMA Convention to be in May At White Sulphur Springs

The annual meeting of The Gas Appliance Manufacturers Ass'n will be held on May 28, 29, and 30 at the Greenbrier, White Sulphur Springs, W. Va.



Reynolds Service Regulators are built to meet specific requirements—years of operation in the field through a complete range of operating conditions have proved not only their superiority but their durability. With parts so precisely machined for each model that they are completely interchangeable. The accuracy you require in performance is assured.

MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For horizontal or vertical connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal or diaphragm operated relief valve.

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.
GAS CONTROL SINCE 1892

O. R. Candler Chosen Vice-pres. Of Detroit-Michigan Stove

Otis R. Candler has been elected vice-president in charge of all manufacturing operations of Detroit-Michigan Stove Co., Detroit, Mich., according to an announcement by John Fry, President.

Mr. Candler started with the company in 1926 as assistant superintendent.

Explosion Liability

(Continued from page 33)

put to that use, he is liable for negligence."

The higher court very consistently holds that a city is not liable for negligence of its officers, employes or agents who performed purely governmental functions for the benefit of the public. Hence, irrespective of negligence of a city's officials, employes and agents the city will *not* be held liable unless the complaining party proves conclusively that the former were acting in a proprietary capacity when the damaging acts were performed.

For illustration, in Masters v. Hart, 55 S. E. (2d) 205, reported November 1949, it was shown that one Hart occupied a part of an office building as a tenant. One day he was killed when gas which escaped and collected in the basement exploded when ignited by a match struck by the janitor of the building. Hart's dependents sued the city for damages alleging that the city is liable because it had supervision over all gas connections which were installed by the Consumers' Utilities Co. which supplied the gas. Hart's dependents alleged further that if there were any improper, negligent or careless installations of the gas connections in the building, it was due to the negligence of the city in approving or failing to disapprove the connections and alterations which were made.

In holding the city not liable, this court said:

"The city is a municipal corporation, and is charged with both governmental and proprietary duties. It is only where a municipality acts in a private, proprietary or ministerial capacity that it is liable in a tort action. The allegations stated in the affidavit filed in this cause are not sufficient for us to determine whether the city at the time was acting in a governmental, or a proprietary, capacity."

Recently a higher court held that when the testimony shows that through negligence of a gas company's employes individuals are injured and also real property is damaged, the company is liable for both wrongs, or double liability.

For example, in Calhoun v. Kentucky-West Virginia Gas Co., 166 Fed. Rep. (2d) 530, reported March 1948, it was shown that a large pumping plant was put into operation by the Kentucky-West Virginia Gas Co. in 1941 which furnishes the motive power for a long-distance pipe line transporting natural gas. Certain property owners filed suit against the gas company to recover damages for injuries resulting from operation of the plant, and also for damages equal to depreciation in the market value of their property. The lower court decided that damage allowance is limited to damage to real property and that the company is not liable for annoyance, inconvenience, sickness, or personal discomfort of nearby home owners caused by operation of the plant. The higher court reversed the verdict, saying:

"There are cases which seem to hold that a plaintiff (property owner) may recover for discomfort suffered by him and his family in addition to the actual damage to his property."

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DISC TYPE CHECK VALVE

Flanged and
Fabricated in steel

For GAS and AIR
LOW and HIGH PRESSURES

Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE COMPANY
South Norwalk, Conn.

CONVENTION CALENDAR

March

23-24 *New England Gas Association,* Hotel Statler, Boston, Mass.
27-29 *Southern Gas Association,* Galveston, Texas
31 *The Maryland Utilities Association,* Lord Baltimore, Baltimore, Md.

April

3-5 *A.G.A. Distribution, Motor Vehicle, Corrosion Conference,* Book Cadillac Hotel, Detroit, Mich.
4-6 *A.G.A. Sales Conference, Industrial & Commercial Gas Section,* Chase Hotel, St. Louis, Mo.
10-12 *Mid-West Gas Association,* Hotel Lowry, St. Paul, Minn.
12-14 *National Petroleum Association,* Hotel Cleveland, Cleveland, Ohio
20-22 *Florida-Georgia Gas Association,* Business Conference, Biltmore Hotel, Palm Beach, Fla.
28-29 *Indiana Gas Association,* French Lick Springs Hotel, French Lick, Ind.

May

1-4 *Chamber of Commerce Annual Meeting,* Wash., D. C.
8-9 *A.G.A. Natural Gas Department,* Spring Meeting, Mayo Hotel, Tulsa, Okla.

Flow Meter Engineering

By L. K. Spink—Published by The Foxboro Co., Foxboro, Mass. Price $7.00.

This handbook has just appeared in a new and enlarged edition. Mr Spink is well known as an engineer who has devoted many years to the study of flow measurement. In the present edition of his handbook, a new section is contributed by R. L. Parshall, inventor of the Parshall Flume, giving design details, operating instructions, and tables for measuring flows through open channels by means of weirs and flumes.

An 8-page index lists the subjects treated in the 416 pages of text and illustrations.

Equations and curves for calculating throttling orifices to be used at critical pressure drops are a new addition to the book. Other new data include a complete section on measurements of fluid flow in metric units, a table of corrections for barometric pressure, a table of pressure multipliers up to 5000 psig, a description of practical methods of applying AGA gas measurement committee report 2, new and simplified instructions for use of the square-root planimeter on gas meter charts, and pages of examples of typical calculations in flow meter engineering.

200 Operating Men Attend Natural Gas Conference Sponsored by Black

An East Coast natural gas conference, sponsored by Malcom W. Black and Co., New York manufacturers representatives, drew an attendance of over 200 operating gas men, superintendents of distribution and others from the eastern and New England utilities for a three day series of meetings in New York late in January.

The program was in the form of question and answer panels, repeated each day for the three days, designed to assist gas engineering and operating personnel in a better understanding of the measurement, control and regulation of natural gas.

Three speakers and discussion leaders were: E. N. Armstrong, superintendent of measurement, Transcontinental Pipe Line Co.; P. H. Miller, superintendent of measurement, Texas Eastern Transmission Corp.; and K. R. D. Wolfe, vice-president of Fisher Governor Co.

Brand Made Chairman of LP Promotion Committee

Selection of Lee A. Brand, vice-president, Empire Stove Co., Belleville, Ill., as chairman of the National Committee for LP-gas Promotion has been announced. He succeeds the late John C. Pankow, director of sales for the Detroit-Michigan Stove Co., who died Nov. 30.

Denver Plumber Wins Highest Water Heater Prize

Public Service Co. of Colorado, Denver, is proud that a Denver plumber won top national prize in the 1949 water heater sales contest of the Gas Appliance Manufacturers Ass'n.

D. A. Bell, President of the Bell Plumbing & Heating Co., President of the Colorado Master Plumbers Association, and vice-president of the Rocky Mountain Gas Association, was awarded the grand final national prize of a new Buick Super Sedan with Dynaflow. Mr. Bell also won $300 in US Savings Bonds at the end of each of the three quarters, in addition to $1,000 for selling the greatest number of water heaters in Region 5 during the year, and another $1,000 for selling the greatest number of the highest priced water heaters.

How TO
SAVE MONEY!
When purchasing gas regulators you should be interested in obtaining the most pressure control for your money —NOT in their size, weight, color or appearance!
MAXITROL Gas Regulators definitely give you more for your money in performance and rated B.T.U. capacity!
MAXITROL Gas Regulator's exclusive "Straight-thru-Flow" principle permits, in many cases, reduction in size of the entire manifold assembly. The resultant savings on gas valves, shut-off valves, etc. can exceed the cost of the MAXITROL Gas Regulator!
THIS new product may help you to greater savings. We'll be glad to offer further information.
DETROIT GAS REGULATOR CO.
1742 RIVARD Maxitrol DETROIT 7, MICH.

SULFUR-FREE GAS
AT LOWEST COST
WITH IRON SPONGE

Iron Sponge is a concentrated purification material that operates with high efficiency at high or low pressures, has excellent capacity and activity, gives long service between foulings and is simply and quickly regenerated. This is why Iron Sponge has been preferred for H_2S removal for over 75 years.

CONNELLY Inc.
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Elizabeth, N. J. • Los Angeles, Calif.

Shifting FPC Viewpoint

(Continued from page 22)

3. Producer A discovers gas in a new territory. Producer B then comes into the proved area, but since he now has to pay much more for his leases than A had previously done for untested acreage, the regulated "utility" price of B's gas would be fixed at a correspondingly higher level based on his greater costs.

As these examples of diverse conditions indicate, the basic fallacy in treating gas production as a utility operation is its failure to recognize that the value of a resource such as natural gas bears no consistent relationship to the cost of finding and producing it. Justice Jackson expressed it succinctly in his dissenting opinion in the *Hope* case[23] when he observed that in the speculative business of finding and producing gas there is very little relation between what one puts into the ground and what he gets out of it.

The proposed regulation would also be a serious threat to the real interests of interstate gas consumers, among other reasons because of the price disparities created as between gas sold for interstate transmission under utility price-fixing and gas sold for intrastate use. It seems evident that prudent gas producers would be impelled to avoid further contracts for the sale of gas in interstate markets, wherever other opportunities were available or might be developed. Many of them have already been hesitant, or have actually refused, to sell their gas for interstate movement until the existing uncertain conditions are relieved by the Congress. Only the high-cost producers would be likely to seek interstate outlets if the proposed theory of utility price-fixing were applied to interstate gas.

Although the Congress has not yet taken legislative action on this matter, in one respect it has already made its position unmistakably clear. It does not look with favor upon efforts made by members of an administrative agency to usurp its legislative authority. The Senate made that emphatically plain last October when, for this and other reasons, it rejected overwhelmingly the reappointment for another term of the former Commissioner who had spearheaded the drive to assume unauthorized powers by administrative fiat.

[23] Federal Power Commission, *et al v.* Hope Natural Gas Co., *320 U.S. 591 (1944)*.

Natural Gas Knocks

(Continued from page 14)

plates a maximum daily demand in the fifth year of operation of 384,251 M cu. ft., and a minimum daily demand of approximately 200,000 M cu. ft.

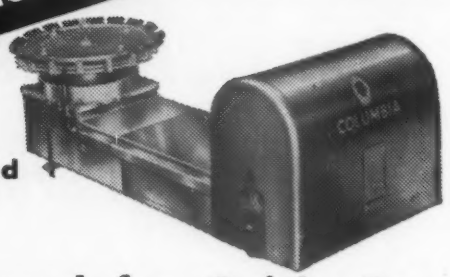
One of the exhibits Atlantic Gulf placed before FPC showed holder costs for certain of the manufactured and butane companies. For water gas the figures varied from 43.3 cents per M cu. ft. to 79 cents. For butane-air the spread was from 72 cents to $1.09.

Atlantic Gulf stated at a hearing that it planned to obtain an average selling price of 31.2 cents per M cu. ft. in the first year of operation, and 31.7 cents in the fifth year.

The territory covered by this study has been a rich field for LP-gas. Most of the gas companies have installations as standby equipment, and in many cases entire towns are served in this manner, the gas manufacturing equipment having been abandoned.

The south also has been one of the best areas for home installations of underground butane tanks or bottled gas units. This business has grown rapidly in the past decade, and it has been estimated that in Virginia, the Carolinas, Georgia, Florida, and Alabama there are in the neighborhood of 400,000 in-

COLUMBIA Model "J" Conversion GAS BURNER



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One Burner for all Types of Gas

Model "J" is Columbia's newest and most popular model for home heating plants. Dealers are enthusiastic about it because installation is quick, easy, and simple. Scientifically engineered for perfect fit in any furnace. Steel and Cast Iron construction. No Baffles or Ceramics. Telescoping Duct and Venturi.

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"A" TYPE METERS
"B" TYPE METERS
DIAPHRAGMS

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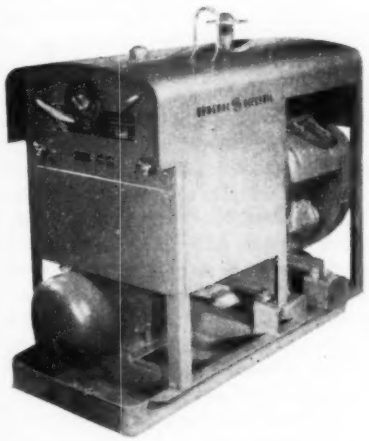
stallations. Of course, the price of butane has been cheap, varying from 12 to 16 cents a gallon, which is roughly equivalent to a therm. The effect which natural gas will have on the LP-gas industry will depend on proximity to pipe lines, density of population in consuming sections, and the price at which natural gas is sold.

New Engine-Driven Welders Announced by GE



A new line of five lightweight mobile engine-driven d-c arc welders has been announced by General Electric's Welding Division.

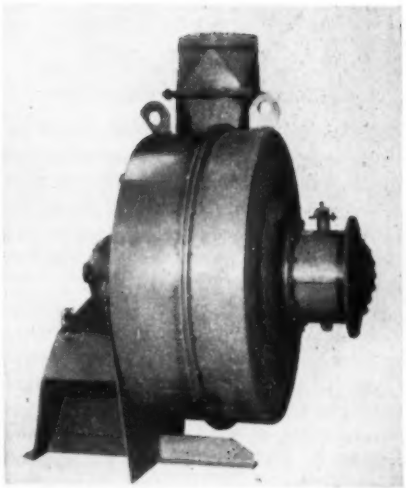
One of the five in the WD-40 series consists of a general-purpose, heavy-duty welder, the WD-42AGW. It is driven by a 31-hp Wisconsin VP-4 air-cooled engine with a magneto ignition. A manually operated slow-down control economizes on fuel by slowing the engine to idling speed when not holding a welding arc. The WD-42AGW is designed for welding jobs requiring a heavier duty cycle and a good degree of portability, such as pipe line operations.

Handley-Brown Has New Line Of Gas Water Heaters

Production of a new streamlined line of gas water heaters was recently announced by Harold E. Handley, President of Handley-Brown Heater Co., Jackson, Mich. Cabinets on the new models feature use of zinc-coated steel for rust resistance and smoother finish.

North American Adds Seven New Blower Sizes

North American Manufacturing Co., Cleveland, has recently added seven new blower sizes to the line of blowers known as the "300" series. These additions are of the large volume, low pressure type and come in either single or two-stage units. They may be obtained in the directly connected style shown or with V-belts transmitting the power from the motor to the blower impellers through a jackshaft.



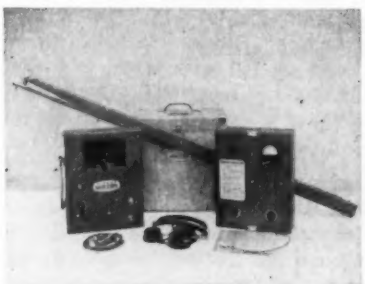
Four ounce blowers give 4000 and 4700 cfm with 7½ and 10 hp 1750 rpm motors respectively. Eight ounce blowers give 2480, 4250 and 4800 cfm with 10, 15 and 20 hp 1750 rpm motors. Two blowers with 50 and 60 hp 3600 rpm motors give 6000 and 7560 cfm respectively.

M-SCOPE Pipe Finder

LIGHTWEIGHT MODEL

Catalog No. 25H

On Request



JOSEPH G. POLLARD CO., Inc.

Pipe Line Equipment

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AMBLER, PENNA.

MORE THAN FORTY-FIVE YEARS OF SOUND

STEEL PLATE CONSTRUCTION

GAS HOLDERS PURIFIERS

Metallizing as Holder Protection

(Continued from page 18)

silica sand was used in preparation for metallizing, it was found necessary to follow up the initial sandblasting with a second application of a coarser abrasive material to form a deeper and rougher etching essential for the proper application of the molten metal.

Finished surfaces were coated either with metal spray or priming paint within four hours after having been blasted. Care was taken that all blasted surfaces were not touched with any foreign materials which might leave a layer of oil, grease, or moisture before the molten metal or paint was applied. Blasted or partially blasted surfaces which were thus contaminated were cleaned with carbon tetrachloride before being painted or metallized.

Since dust from sandblasting is not only a nuisance but a hazard to health, the men wore respirators. Excess dust or used grit was removed not only from the blasted surfaces but also from the site of the work, thus eliminating the flying of dust to outside areas.

No sandblasting was done when atmospheric conditions showed signs of moisture or fog or when a temperature below 50° was indicated. Blasting materials were passed upon by the city's inspectors prior to use on the job.

The steel after blasting had a frosted silver appearance, indicating the most perfect condition for immediate spraying or painting. All sandblasted surfaces were fully coated with metal or paint within four hours.

Controlling Coating Thickness

In metallizing, the thickness of the metal coat is an important factor, both from the standpoint of the life of the coating and the cost of the application.

The life of sprayed zinc coating, for example, is almost directly proportional to the thickness of the coat. It is equally important that the coating be constant over the entire area, since the effectiveness of a coating is determined by its thinnest point.

A number of methods have been developed to insure uniformity of coating thickness. The best method thus far devised, according to Metallizing Engineering Co., Inc. is the "area-weight" method, used in combination with an electric thickness gauge. By the "area-weight" method the thickness of the coating desired is determined by calculating the weight of wire necessary to coat a square foot of area. With this factor established, the total number of square feet of area to be metallized and by weight the amount of wire needed is easily determined.

It is then the responsibility of the operator to distribute this weight of metal evenly over the allotted area. An electric thickness gauge provides a dependable method of measuring quickly and accurately the thickness of the coat applied.

This gauge measures the thickness of all coatings of non-magnetic metals on iron or steel, thus covering about 90 per cent of the corrosion resistant coatings applied by metal spraying. Its use guarantees that specifications are met on each job, and by controlling coating thickness, the gauge also effects financial savings by assuring an accurate application of the metal.

Applying the Coating

Metallizing guns used consist of two major parts—the wire feeding or gear reduction unit, and the combustion or gas head.

The wire is fed into the rear of the gun by the gear reduction unit, which operates a pair of feed rolls, propelling the wire into and through the gas head at a constant speed. The gear reduction unit is rotated by a small but powerful turbine which is operated by compressed air.

Maintaining and adjusting the speed to suit the melting point of the metal being sprayed is the job of the control power unit, which is an integral part of the turbine. By means of this device, the operator can, without changing gears, regulate the travel to the combustion head of any one of 33 wires to the speed at which it best atomizes.

The wire hits the gas-oxygen flame at the combustion head of the gun at approximately 6300° F, the temperature necessary to melt and atomize the metal properly. The atomization is accomplished by compressed air, which forces the hot gases into a cone shape around the wire. These hot gases shear off the metal as soon as it becomes molten, and drive the tiny particles at high velocity onto the surface being metallized.

The modern metallizing guns for general purposes are compact and easily portable. All that is needed is a source of compressed air (from 10 to 35 cu. ft. per minute at 60 pounds pressure, depending on the size of gun used) a source of commercial gas (acetylene, propane, hydrogen, manufactured or natural gas) and oxygen. The metallizing equipment consists of the gun itself, hoses, gas and air regulators, and a reel stand to carry the wire. The set-up is so simple that it can be used anywhere, occupying little more floor space than the operator himself.

No especially skilled help is required. Anyone can learn to operate a modern Metco metallizing gun, either small or large, in a few hours. The type 3E gun, handling 1/8 inch wire and the type Y gun handling 3/16 inch wire were used on the Long Beach job.

One-eighth inch zinc metallizing wire feeds through the gun at 13 feet per minute; 3/16-inch zinc wire at 9 1/2 feet per minute or approximately 50 lbs. per hour.

Metal spraying was done to insure complete coverage and good mechanical adherence. The spray gun was held from six to 10 inches away from the surface and as nearly perpendicular to the surface as possible; at no time was this angle permitted to become less than 60° with the surface being coated. To insure a uniform deposit, two coats or passes were employed, wherever possible, the second coating being applied at a right angle to the first coating. Each separate coat was sprayed on to form a ribbon, and each successive ribbon was applied to overlap the adjacent ribbon by approximately one-third of the ribbon width. The oscillation of the gun was uniform in action to insure a uniform deposit.

A deposit of not less than 1/4 pound of zinc wire was applied to each square foot of surface area in order to insure a minimum thickness of not less than 0.006 inch sprayed metal.

Inspection

All surfaces metal coated in accordance with the specifications were subject to inspection by authorized inspectors who were given all reasonable facilities to determine conformance with the requirements. The inspectors made visual examinations of the processed surface for complete and uniform coverage, and to make certain that the coating was free of defects such as cracks, porosity or voids. Lack of adherence or hollow spots were detected by tapping with a small metal object. By following this procedure a uniformly and finely divided grain structure with no evidence of unatomized or unmelted particles was obtained.

The thickness of the deposits was determined by checking the poundage of the zinc wire used in covering any certain area of surface. Beyond that it was the responsibility of the inspectors to detect as far as it was possible any "holidays" or lack of uniform coverage or pin holes in the metal applied to the tanks and to order further application of sprayed metal to the job to correct any and all incomplete or faulty work before final approval.

For absolutely accurate checking, an electric or magnetic thickness gauge is highly recommended.

Natural Gas Odorizing

(Continued from page 16)

these leaks on a map of the distribution system. This map will show at a glance if the odor level is uniform throughout the entire system. The number of leaks reported and the variation in number from week to week are a positive guide to the efficiency with which the job of odorization is being performed.

A proper figure for the number of leak reports received from customers is one leak per thousand meters per week. Experience has shown that a lower figure is indicative of inadequate odorization. If the figure can be maintained at two or three per thousand meters per week without undue burden on the company's service facilities, it will pay dividends in hazards avoided and gas conserved.

Such a record of leak reports, together with a log of the odorant added, is *prima facie* evidence of good odorization. In the event of a civil suit introducing a question on odorization, witnesses drawn from the list of customers who have reported leaks in the immediate neighborhood are invaluable. These customers will testify, consciously or unconsciously, to the fact that they received adequate warning of escaping gas. No record of laboratory tests or other test made by the company's personnel will so firmly establish the fact of adequate odorization in the minds of a jury as this testimony.

The amount of odorant used per million cubic feet of natural gas by companies throughout the country varies in widely. A part of this wide variation is due to differences in opinion as to what odor level constitutes adequate odorization. Companies that have recently changed to natural gas invariably require a higher odor level than companies that have distributed natural gas for a period of many years.

It is generally accepted that something over 0.5 pounds of the mercaptan blends is required per million cubic feet of natural gas for good odorization. Most companies that have changed from manufactured to natural gas use 0.75 to 1.25 pounds per million cubic feet. In reforming operations about 0.3 to 0.5 pounds per million cubic feet is needed, depending on the particular conditions.

Comparisons of one odorant in one location with another odorant in another location are grossly misleading. The relative volumes of the various odorants that are required must be determined in the same property.

Mercaptan blends are non-corrosive and non-toxic if properly compounded. They add about ¼ grain of sulphur per hundred cubic feet of gas when used at the rate of one pound per million cubic feet. They cannot be detected in the products of combustion of the gas, they have no deleterious effect on non-ferrous metal heat treating processes or glass making processes, and do not harm the catalysts in processes cracking LP-g. A consideration of the amount of organic sulphur necessarily present in most manufactured gases should give reassurance in this direction.

In conclusion, gas odorization is a highly developed art, if not a science. It is a tool that can be used to good advantage by gas companies for the safety of their customers and employees and the conservation of the gas they distribute.

It has been the purpose of this paper to outline the subject of gas odorization and to present the generally accepted facts concerning the subject. It does not pretend to be all-inclusive and is expected to bring forth inquiries from readers interested in greater detail.

Pressure Regulator Bulletin

A new bulletin on model 46 pressure regulator has been issued by Chaplin-Fulton Manufacturing Co., Pittsburgh, Pa.

Classified

"WANTED: Design Engineer. Graduate Mechanical Engineer with experience in design of pumps, meters, controls and/or allied equipment used in petroleum industry. Age: 30 to 40 years. Excellent opportunity with well established firm. Inquiry confidential. Reply giving full particulars to Box 213, American Gas Journal Inc., 205 E. 42nd St., New York City 17."

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#3700 addressograph bill printing and addressing machine. Write Milwaukee Gas Light Co., 626 E. Wisconsin Ave., Milwaukee, Wisc.

Develop 'Portable Office' For Service Men's Use

A meter or service order card carrying case for service men of gas, electric and water utilities has just been placed on the market by Remington Rand Inc.

The case, a wallet-type kit of leather, holds 6 x 4 size order cards against a firm surface for easy posting, and provides a pocket in which to place the completed orders. The pocket will also contain a pad of the temporary order blanks used in recording emergency orders.

Small enough to fit into an overcoat pocket, yet substantial enough to permit comfortable posting without the aid of a desk or table, the kit serves as a travelling "office" for meter readers.

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Pollard Co., Joseph G. 45
Reynolds Gas Regulator Co. 41
Robertshaw-Fulton Controls Co. ..... Front Cover
Safety Gas Main Stopper Co. 48
Semet-Solvay Engineering Division, Allied Chem. & Dye Corp. 1
Servel, Inc. ..... Inside Back Cover
Skinner Co., M. B. ..... —
Sprague Meter Co. ..... Back Cover
Stacey Bros. Gas Construction, Division of Dresser Industries ..... —
Stacey Manufacturing Co. 40
Superior Meter Co. ..... —
United Engineers & Constructors, Inc. ..... —
Vulcan Proofing Co. 39
Wachs Co., E. H. ..... —
White, Weld & Co. 32
Whittington Pump & Engineering Co. ..... —

All-Gas House

(Continued from page 23)

ceptional cooperation from the newspapers, the high point being the appearance of illustrated feature articles in five successive issues of the Los Angeles *Sunday Times* with a circulation of over 780,000.

3. News column publicity was supplemented by tie-in advertising placed in the popular home magazine supplement of *The Times* by the cooperating manufacturers and the appliance companies.

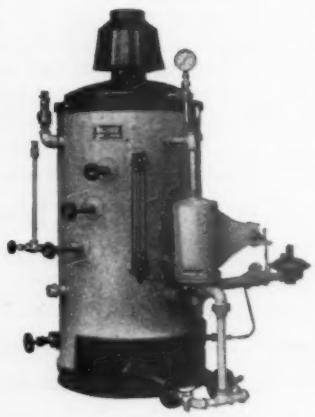
4. The direct cooperation with the students afforded the utility an opportunity to acquaint young architectural students with the beauty, convenience, and economy of the all-gas home.

"Villagaire" was the outgrowth of a suggestion made to the architectural school that too many young architects have little practical knowledge of construction costs and of what the public will buy. To help correct this situation, California Federal agreed to furnish a lot and the cost of construction for a home to be designed by members of the senior class of the School under the supervision of a committee of men in the building field.

As a result Dean Gallion appointed a four-student team composed of Gerald King, Paul Tay, Jack Strickland and Harry Wilson. Through conference among themselves and with real estate men and builders, these students designed the house, drew the plans, and supervised the construction. They had two primary objectives: (1) to produce a saleable commodity; (2) to develop their own professional knowledge and talent.

Upon completion of the period of public exhibition on April 15 the house will be offered for sale with any profit over and above cost to be presented to the School of Architecture for a research fund.

LATTNER
GAS BOILERS
1 H.P. to 45 H.P.



2 H.P. Gas Fired Pressing machine boiler. 100 lbs. ASME Code.

P. M. LATTNER MFG. CO.
CEDAR RAPIDS, IOWA

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

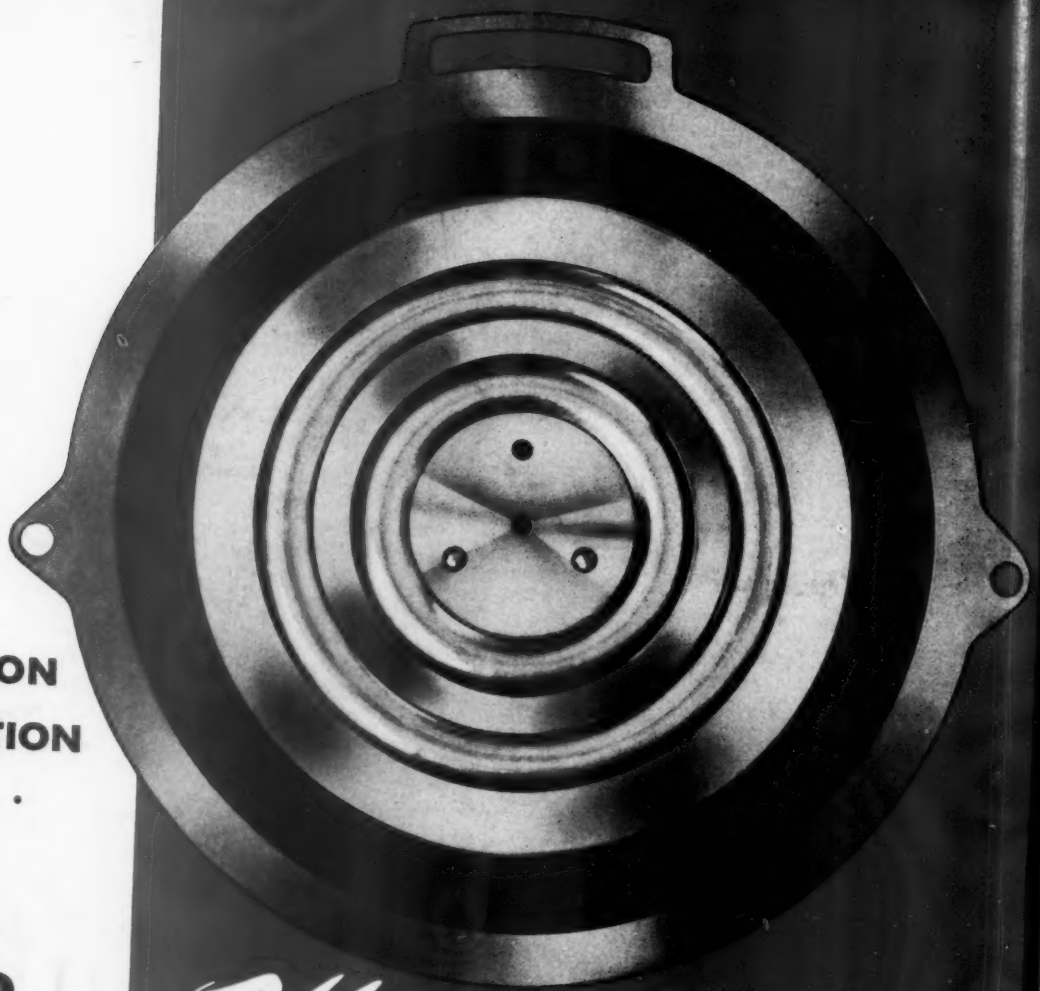
Here's Gas Refrigeration's fighting challenge for '50

This bold new theme will echo across the nation in all ten of these powerful publications

Before Mr. and Mrs. America do any refrigerator buying in 1950, they're going to be challenged to "Look at *both* types!". . . and *then* decide. Aggressive ads will urge them to weigh carefully the *big differences* in the two kinds of refrigeration, and to consider that *only* Servel—the Gas Refrigerator—stays silent, lasts longer . . . because *only* Servel has no moving parts in its freezing system to wear and grow noisy. These ads are sincere. They're convincing. They will influence millions of people . . . make them more cautious buyers . . . rouse them to *see Servel* before they buy.

How can you reap the benefits of this stirring national campaign?

Remember—all business is local. So to translate this "new awareness" of the Gas Refrigerator into sales, you need strong, steady local advertising. And an alert promotional program—from window displays to floor demonstrations. So get set. '50 is the year for an awakened interest in Gas and Gas Refrigeration. Servel, Inc., Evansville 20, Indiana.



for

SMOOTH ACTION
EASY INSTALLATION
LONGER LIFE . .

. . THE PERFECTED Sprague Metal Flanged

DIAPHRAGMS

Improved proof characteristics and dated diaphragms are some of the other noteworthy features of this new diaphragm.

AVAILABLE NOW FOR THE NUMBER 1A, 2, 3, and 5A METERS

THE SPRAGUE METER COMPANY
BRIDGEPORT, CONNECTICUT